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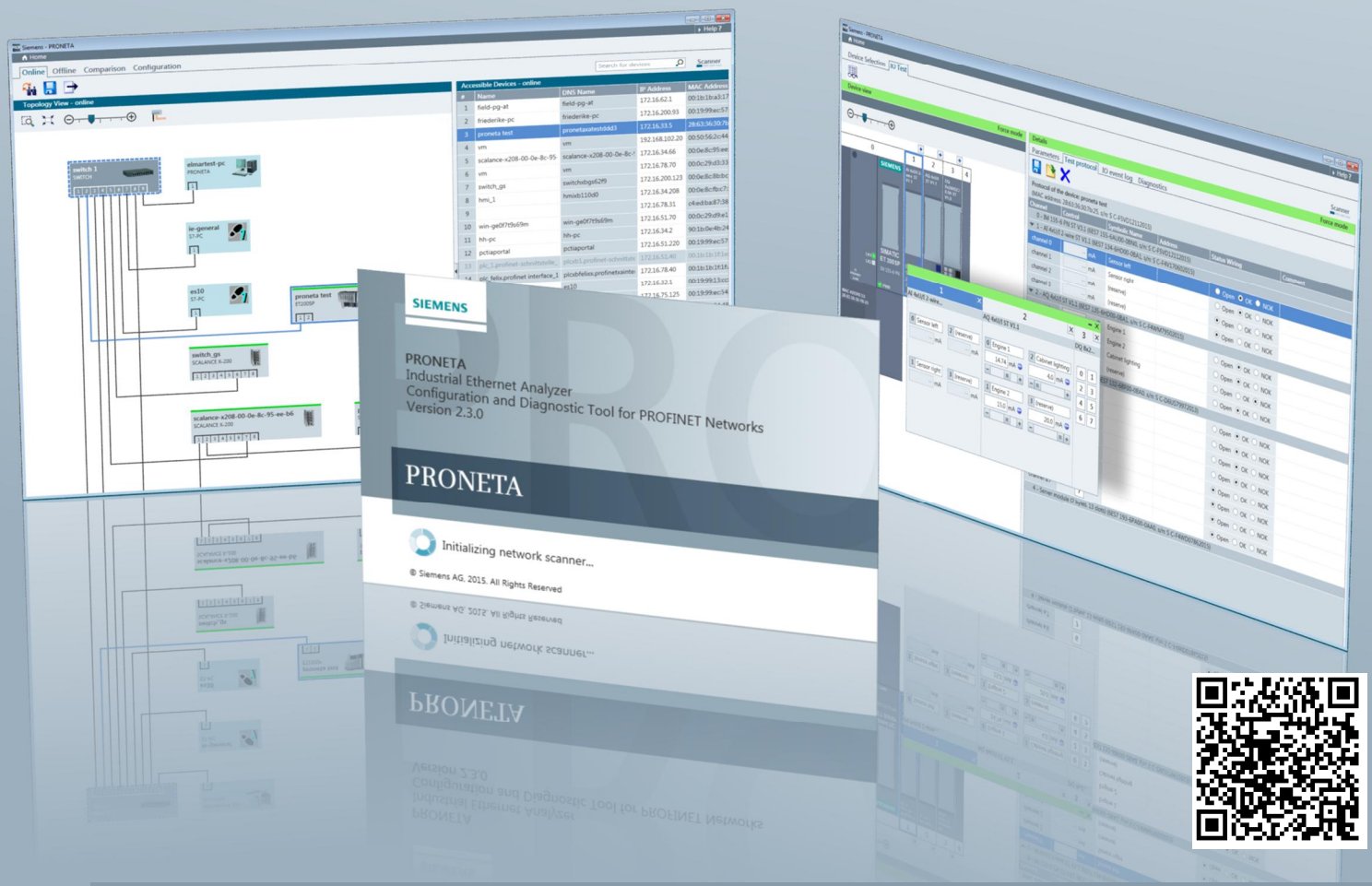

Application description • 11/2015

PRONETA User Manual

PROFINET Networks Analysis Tool V2.3

https://support.industry.siemens.com/cs/ww/en/view/67460624

Warranty and liability

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Table of contents

Warranty and liability **2**

1 Introduction **4**

2 General **6**

2.1 Features 6
2.2 Installing and Running PRONETA 6

3 Using PRONETA **8**

3.1 Basics of PRONETA 8
3.1.1 Overview 8
3.2 Network Analysis Task 10
3.2.1 Online Mode 10
3.2.2 Offline Mode 18
3.2.3 Comparison Mode 19
3.2.4 Configuration Mode 23
3.3 IO Test Task 25
3.3.1 Device Selection Mode 26
3.3.2 IO Test Mode 26
3.4 Settings 34
3.4.1 General Settings 34
3.4.2 Network Adapter Selection 35
3.4.3 GSDML Manager 36

4 Working with PRONETA **37**

4.1 Selection of the PRONETA Network Adapter 37
4.2 Displaying the Devices and Topology of a PROFINET Network 38
4.3 Comparing and Configuring Different Topologies 40
4.4 Configuration of the PROFINET Devices 42
4.4.1 Automatic PROFINET Device Configuration 42
4.4.2 Manual Configuration of a Single Device 43
4.4.3 Transfer of the Device Name for a Single Device 44
4.4.4 Transfer of Device Names for a Whole Network 46
4.5 Creating an Inventory of the Network 47
4.6 Testing the Correct Wiring of the Distributed I/O 49
4.6.1 Checking the Station Configuration 49
4.6.2 Checking the Signal Wiring: “IO Test” 51

5 Related Literature **56**

6 History **56**

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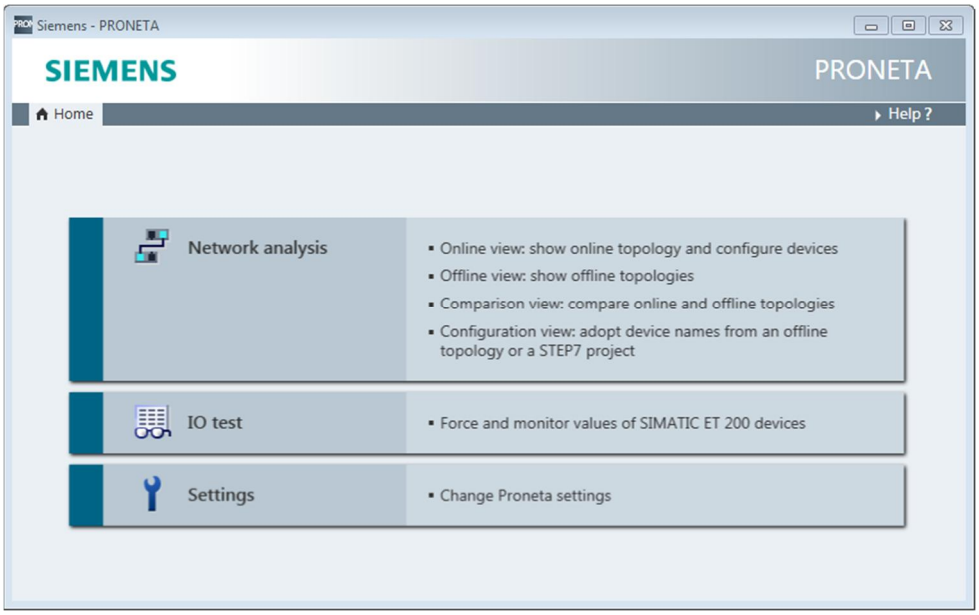
1 Introduction

PRONETA (“PROFINET Network Analyser”) is a simple tool intended for the rapid analysis and configuration of PROFINET networks and the simple testing of ET 200 distributed IO systems. It is well suited for solving two tasks fundamental to the commissioning of PROFINET installations:

- The “Topology task” gives a quick overview of the devices connected to PROFINET. It features simple configuration options, like setting network parameters or giving thema network name, as well as powerful mechanisms to compare several network topologies with each other, for example to compare an “ideal” topology intended for a project with the actual installation.
- The “IO Test task” is a simple and intuitive method to test the IO wiring of an installation with numerous distributed IO devices. It allows for checks of the wiring and will automatically set up a protocol of the test procedure which can be exported for documentation purposes.

Both tasks can be performed before a CPU is integrated in the network. Since there are no other engineering tools required, PRONETA allows fast and convenient checks of the system configuration from early on.

Figure 1-1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PRONETA
Home
Help ?
Network analysis
Online view: show online topology and configure devices
Offline view: show offline topologies
Comparison view: compare online and offline topologies
Configuration view: adopt device names from an offline topology or a STEP7 project
IO test
Force and monitor values of SIMATIC ET 200 devices
Settings
Change Proneta settings

PRONETA has the following features:

- Free download from the SIEMENS support websites
- Runs on any contemporary PC, PG or laptop, running Windows
- Allows configuration of networks in early project phases, even before any CPU is installed in the network
- No additional hardware or software required
- Support for PROFINET devices from all vendors
- Support for a wide variety of SIMATIC ET 200 distributed IO modules for the IO Test task
- Support for STEP 7 V5.4 and 5.5 project files

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How to use this manual

This manual consists of the following sections:

- Chapter 2, "General" gives you an overview of PRONETA's features and provides you with the necessary information to install and run the program.
- Chapter 3, "Using PRONETA" is a reference chapter, duplicating the online help, which acquaints you with concepts and the user interface of PRONETA.
- Chapter 4, "Working with PRONETA" guides you through the most relevant tasks performed with PRONETA in a step-by-step manner.

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2 General

2.1 Features

Obtaining PRONETA

PRONETA is available as a free download from the SIEMENS support portal:

- https://support.industry.siemens.com/cs/ww/en/view/67460624

This manual refers to version 2.3.0.15.

System Requirements

PRONETA runs on any contemporary PC, PG or laptop hardware with Windows XP, Windows 7, or Windows 8, each either in the 32 or 64 bit version.

Connection with PROFINET is established via an industrial Ethernet cable.

The following additional software components need to be present as well:

- .NET Framework v4.0 (usually preinstalled on Windows PCs)
- WinPcap 4.1.3 or higher

WinPcap is part of the PRONETA distribution and will be installed alongside PRONETA automatically.

NOTE The 32 bit version of Microsoft Visual C++ must be used even with 64 bit versions of Windows.

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Supported Modules

PRONETA supports all PROFINET-conform devices irrespective of their manufacturer. Naturally, it is the device itself that decides the range of functions.

The IO Test supports most current SIMATIC ET 200 modules.

Modules that appear after the release of version 2.3 can subsequently be supported by importing their GSDML file from the SIEMENS Industry Online Portal web pages, provided they do not require any new functionality. The chapter GSDML Manager (3.4.3) provides more details on this.

Supported SIMATIC Software

PRONETA allows the loading of reference projects created with STEP 7, Versions 5.4 and 5.5.

2.2 Installing and Running PRONETA

Installation

There is no dedicated installation routine for PRONETA. Simply extract the PRONETA file archive into a folder on your PC, and connect your PC by means of an industrial Ethernet cable with your plant.

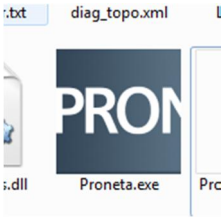
NOTE The extraction path for PRONETA must not contain either of the special characters “#” or “;”.

Should your PC not be equipped with WinPcap, it will be installed with the first program start of PRONETA. The .NET framework, however, must be pre-installed, since it is not a part of the PRONETA distribution.

Starting PRONETA

After installation, , you can start PRONETA by a simple double-click on the program icon in the extraction folder.

Figure 2-1



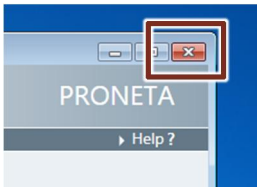
NOTE When running PRONETA for the first time, you will be asked to acknowledge the license conditions before you can proceed.

You may also create a shortcut link to PRONETA on your desktop and start the program from there.

Finishing PRONETA

To quit PRONETA, click on the “Close”-icon of the program’s window.

Figure 2-2



Deinstallation

If you do not plan to use PRONETA any further, perform the two following steps:

1. Delete the folder to which you extracted PRONETA,
2. In the Windows start menu, execute “WinPcap -> Uninstall WinPcap 4.1.3”

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3 Using PRONETA

3.1 Basics of PRONETA

3.1.1 Overview

NOTE Within the scope of this documentation, the term “device” is used as a synonym for “network participant”, “node”, or “component.” Any piece of equipment which takes part in the PROFINET communication with a designated IP address is considered a “device”.

PRONETA is designed to allow you to accomplish one of several “tasks”. These tasks are currently:

- Network Analysis Task,
- IO Test Task, and
- Adjusting the software Settings

The tasks can be chosen from the Home screen, and returning to the Home screen anytime during the operation of PRONETA will allow you to select a different task.

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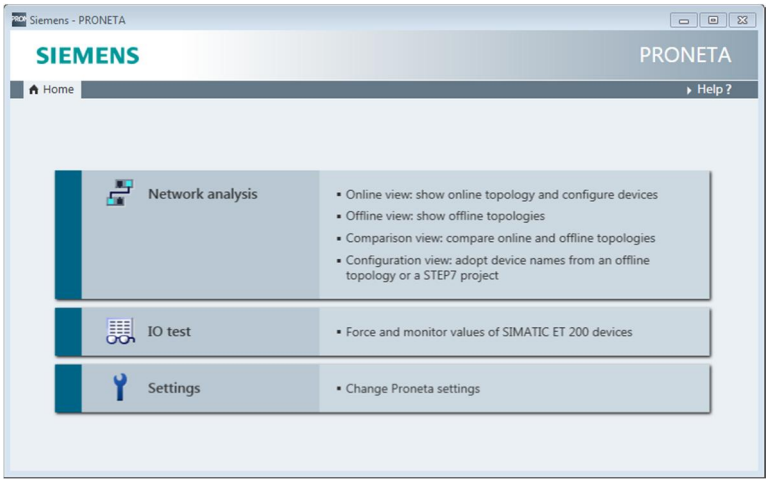
Figure 3-1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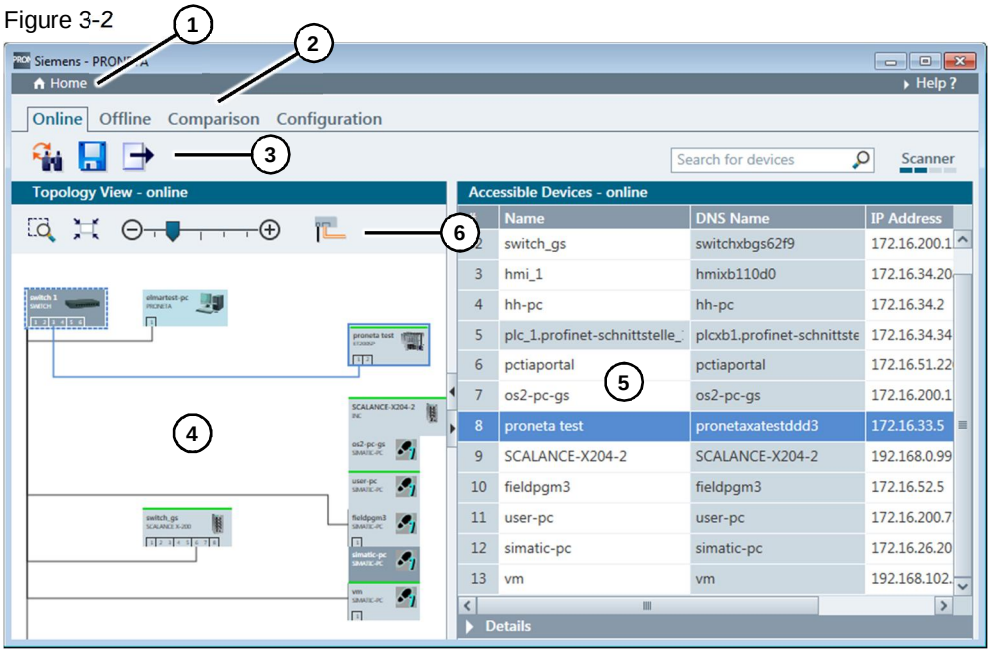
Screen Layout

In general, the PRONETA window is split in several sections:

- A “header bar” (1) on the top,
- Followed by a “mode bar” (2) which allows changing between the “modes”, or individual steps of the task chosen,
- A “function bar” (3) which offers particular functions for the current mode underneath,
- One or more windows with graphical views (4) or tables of relevant information (5) below, like a topology view or a device table.
- The graphical views contain a tool bar (6), designed to perform particular operations depending on the view chosen.

Figure 3-2



Depending on the task and mode chosen, the function bars and the context menus of the topology views and the device tables offer differing functionality. Refer to the help sections in the corresponding chapters to find out details.

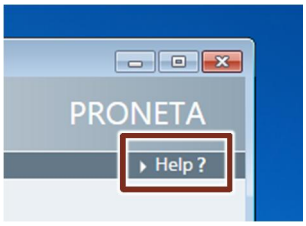
The relative size of the views can be changed by dragging the separating border of the views sideways.

Header Bar

The header bar, which is always visible during PRONETA's run, contains two control elements:

- The "Home" button on the left end of the header bar: Clicking on this will always return PRONETA to the start screen.
- The "Help?" button on the right end of the header bar. Clicking on it opens a menu with three commands:
  - "Help" opens or closes a frame on the right hand side of the window which brings up context-specific help. (Pressing the "F1" function key at any time offers the same functionality.)
  - "Report a bug" collects information about the current state of PRONETA and prompts you to submit an error report to SIEMENS to improve PRONETA performance in the future.
  - "Version and information": Opens a small popup window with information about the PRONETA build you are running.

Figure 3-3



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Reporting a bug

Should you encounter a bug in PRONETA, use the bug reporting mechanism available through the “Help?” button on the right end of the header bar.

PRONETA will create a diagnostic dump of its current state and prepare an e-mail to be sent to the PRONETA support team with that dump attached. (Creating the dump will take a few moments.)

You can add further information to this message (like the exact problems and circumstances of the error, and possible means for us of contacting you for further enquiries etc.) before sending it.

3.2 Network Analysis Task

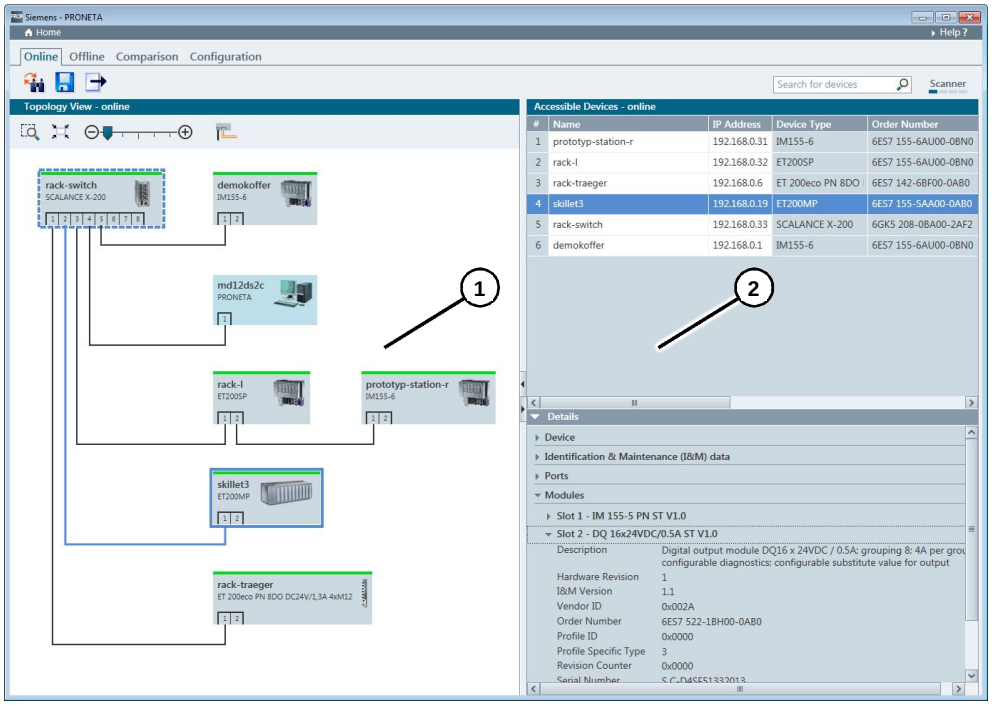
PRONETA’s Network Analysis gives you a quick overview about which devices are installed in your PROFINET network, and how they are connected with each other. The Network Analysis also lets you view and change various network parameters of the devices, like IP addresses, device names etc. Networks can be compared, and the devices automatically or manually configured.

3.2.1 Online Mode

In Online Mode, PRONETA will constantly scan the PROFINET network for present devices. The main screen is divided in:

- A Topology View (1) and
- A Device Table (2) of accessible devices.

Figure 3-4



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Function Bar

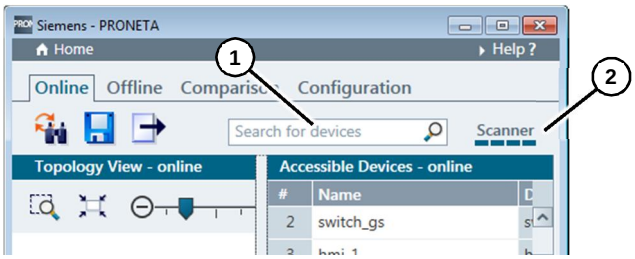
The following functions are available in the function bar:

Table 3-1

Icon	Function
	„Refresh“: Performs an immediate update of the network scan
	„Save Topology“ gives you two options: • Writing the current physical network to disk as a Topology File for later use as a reference network, or • Saving the network as a bitmap (PNG file)
	„Export Device List“: Writes the information about all devices found to disk as a Device Inventory of the network, including module and port configuration. Only columns currently displayed in the Device Table are included)

To the right of the function bar, there is an input box (1) which allows you to search for a particular device. The search term you enter will be matched against the device names, types, and even network parameters, so it is possible to search for a device by its IP address, for example. Matches of your search are highlighted in the topology view and the device table.

Figure 3-5



At the far right, the Scanner Status Indicator (2) displays the status of the current network scanning cycle.

Scanner Status Indicator

On the far right of the function bar, there is a scanner status indicator.

Each network scanning cycle is divided into four phases, represented by the segments of the scanner status indicator. A network scan is complete when the indicator has gone through all four segments.

A right-click on the status indicator brings up a context menu with two items:

Figure 3-6

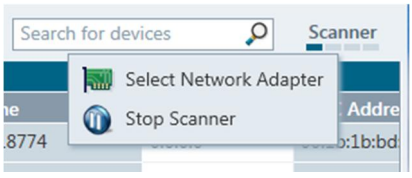


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Table 3-2

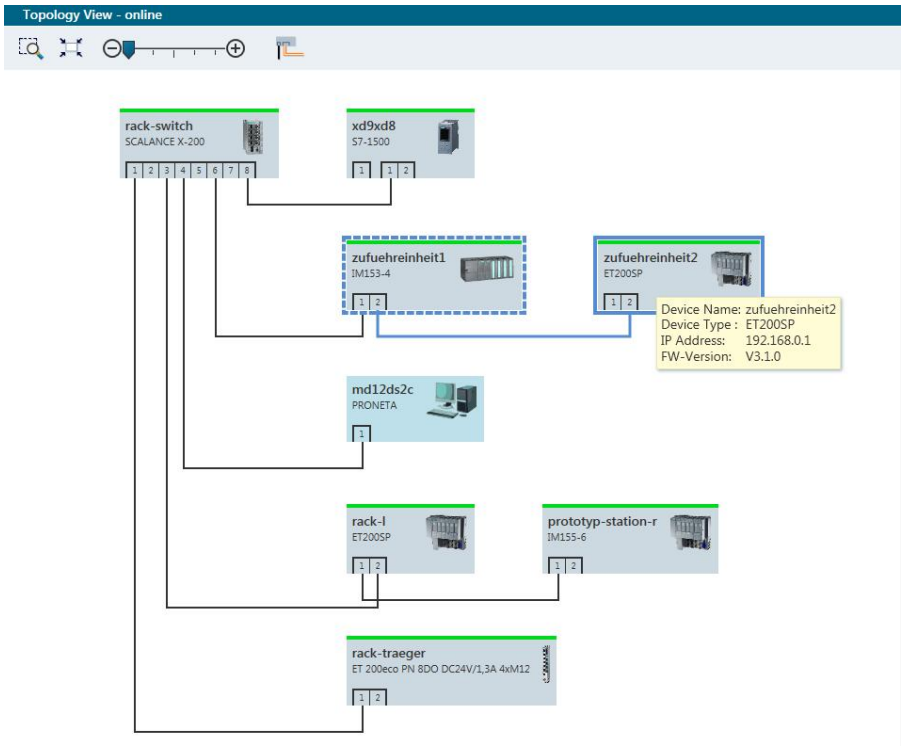
Name	Function
Select Network Adapter	Lets you chose the Interface over which you are connected to the PROFINET network, see also Network Adapter Selection.
Stop Scanner/ Start Scanner	Toggles the network scans off and on. While the scanner is stopped, no network load is generated, and no changes to the topology are acquired.

Topology View

The topology view is a graphical display of the PROFINET network, its devices and their connections to each other either during a current network scan or from a previously stored reference network.

Hovering the mouse pointer over a device will bring up a Device Tool Tip with basic information about that device.

Figure 3-7



Device Display

The device status is indicated by different colors of the icon field and borders:

- Field colors:
  - Light grey with a green bar on top: Regular network device
  - Dark grey: Network device without valid IP address or without valid device name, or generic PC
  - Light blue: PC with PRONETA or STEP 7
- Borders
  - Orange: Device parametrization conflict (duplicate IP address or device name)

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Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

Table 3-3

Icon	Function
	„Zoom selection“, lets you draw a rectangle inside the topology view. Once you release the mouse button, the view will zoom to display the rectangle area
	“Zoom fit to screen”, zooms the view back in a way that all network devices fit inside the view
	Zoom bar, zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on “-“ or “+”.*)
	“Show physical connection types”, indicates the transmission medium used in different color. (See Device Connection Types)

*) You can also zoom into and out of the topology view by placing the mouse over the view and using the scroll wheel.

Device Connection Types

If the option “Show physical connection types” from the tool bar has been selected, connections between devices are color-coded as follows:

- Black: Copper Ethernet wiring
- Orange: Fiber optical connection

A doubled line indicates a ring topology.

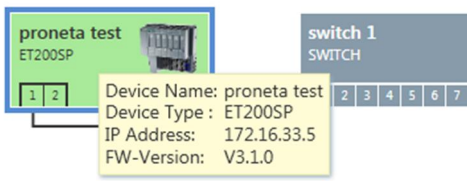
For devices which are displayed without any connection to other devices, the required information could not be gathered.

Device Tool Tips

Hovering over a device will bring up a Tool tip which displays:

- Device name
- Device type
- IP address
- Firmware version (where applicable)

Figure 3-8



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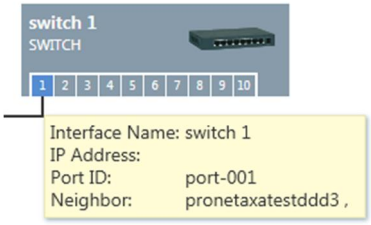
Hovering over a device port displays:

- Interface name
- IP address
- Port ID
- Name of the neighbor

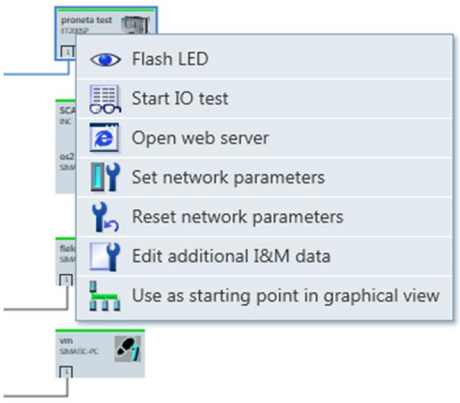
Figure 3-9



Device Context Menu

By right-clicking on any device in a topology view or in the corresponding Device table, you can bring up a context menu with various functions.

Figure 3-10



Not all menu entries are available for all devices with the actual entries depending on the state of the device.

Table 3-4

Icon	Name	Function
	Flash LED	Sets the LEDs on the physical device to flashing for easy identification
	Start IO test	Immediately launches an IO Test Task with the selected device
	Open web server	Opens your PCs web browser and establishes a connection to the device's web server
	(Stop) Flash LED of duplicates in name/IP address	Like "Flash LED", but also flashes the LEDs of all devices which share their name or IP address with the selected device

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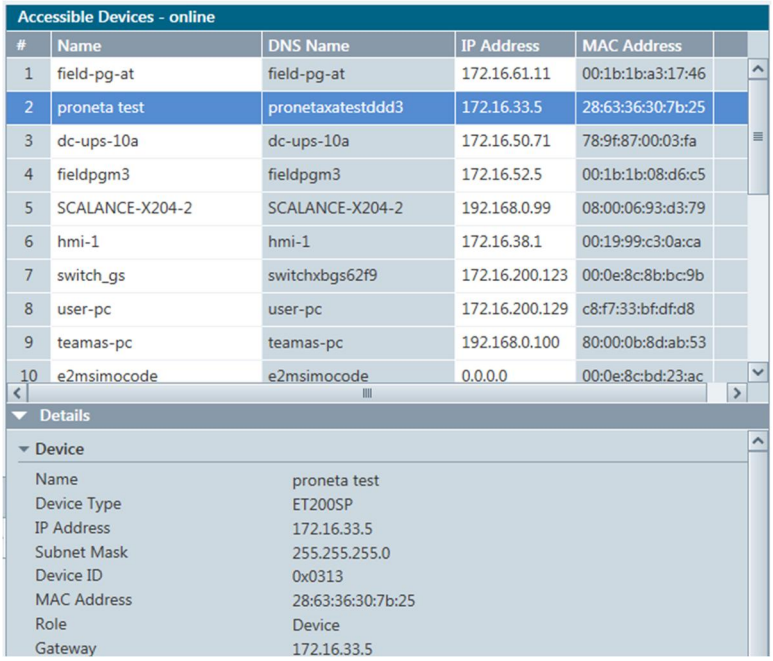
Icon	Name	Function
	Set network parameters	Opens a popup window which allows you to set various networking parameters of the chosen device. For details, see Set Network Parameters.
	Reset network parameters	Performs a factory reset of the device's IP address and device name
	Reset selected	Resets the parameters of *all* selected devices to factory defaults (This command is only available from the Device Table, and only if more than one device is selected.)
	Edit additional I&M data	Opens a popup window which lets you enter data concerning identification and maintenance ("I&M") of the device, like the location and date of the installation
	Use as starting point in graphical view	Centers the topology view on the chosen device

Device Table

This table lists the devices found either during your current network scan (online mode only), or in a stored reference network.

The table can display a large amount of different device data. Right-click anywhere in the table header fields to bring up a menu from which you can select the information fields you wish to display.

Figure 3-11


Accessible Devices - online
Name DNS Name IP Address MAC Address
1 field-pg-at field-pg-at 172.16.61.11 00:1b:1b:a3:17:46
2 proneta test pronetaxatestddd3 172.16.33.5 28:63:36:30:7b:25
3 dc-ups-10a dc-ups-10a 172.16.50.71 78:9f:87:00:03:fa
4 fieldpgm3 fieldpgm3 172.16.52.5 00:1b:1b:08:d6:c5
5 SCALANCE-X204-2 SCALANCE-X204-2 192.168.0.99 08:00:06:93:d3:79
6 hmi-1 hmi-1 172.16.38.1 00:19:99:c3:0a:ca
7 switch_gs switchxbgs62f9 172.16.200.123 00:0e:8c:8b:bc:9b
8 user-pc user-pc 172.16.200.129 c8:f7:33:bf:df:d8
9 teamas-pc teamas-pc 192.168.0.100 80:00:0b:8d:ab:53
10 e2msimocode e2msimocode 0.0.0.0 00:0e:8c:bd:23:ac
Details
Device
Name proneta test
Device Type ET200SP
IP Address 172.16.33.5
Subnet Mask 255.255.255.0
Device ID 0x0313
MAC Address 28:63:36:30:7b:25
Role Device
Gateway 172.16.33.5

White cells inside the table allow information to be entered. The new values will be written to the respective device immediately when the cell loses focus. (This is an alternative way to the use of the context menu entry "Set network parameters")

A left click on a column header will sort the table according to the data in this column.

Dragging a column header with the mouse re-arranges the table columns accordingly.

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Right-clicking on any table entry brings up the current device context menu.

To select more than one device, keep the “Ctrl” or “Shift” key pressed on the keyboard while left-clicking on the respective table entries.

Device Details

In the lower part of the table, a details view for a selected device can be opened and collapsed by clicking the “►”-symbol of the header.

This view shows additional device information complementing the information in the table, in particular port and module configuration data.

Branches of the tree can be opened and collapsed by clicking the corresponding “►”-symbol.

Set Network Parameters

This popup window allows the immediate input of the following parameters for a single device:

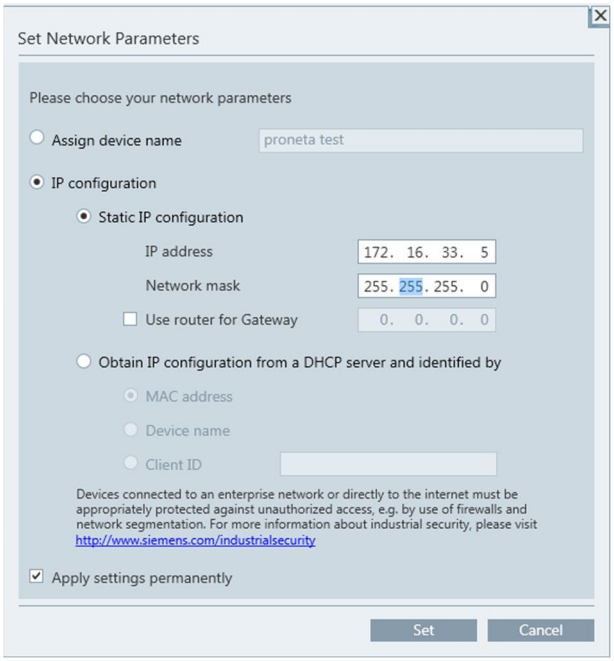
- Device Name
- Static or DHCP IP configuration

Plus, where applicable:

- IP address
- Network mask
- Address of the gateway router

Checking the box “Apply settings permanently” will ensure that the new parameters are retained across a power-off of the device.

Figure 3-12


Set Network Parameters
Please choose your network parameters
Assign device name
proneta test
IP configuration
Static IP configuration
IP address
172. 16. 33. 5
Network mask
255. 255. 255. 0
Use router for Gateway
0. 0. 0. 0
Obtain IP configuration from a DHCP server and identified by
MAC address
Device name
Client ID
Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit
http://www.siemens.com/industrialsecurity
Apply settings permanently
Set
Cancel

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Topology File (XML format)

A topology file as generated by using the corresponding icon from the function bar contains information about a topology in a machine-readable way.

Topology files are useful for storing a physical network configuration for later use as a reference network when comparing an installation, or as a template to quickly reproduce networks.

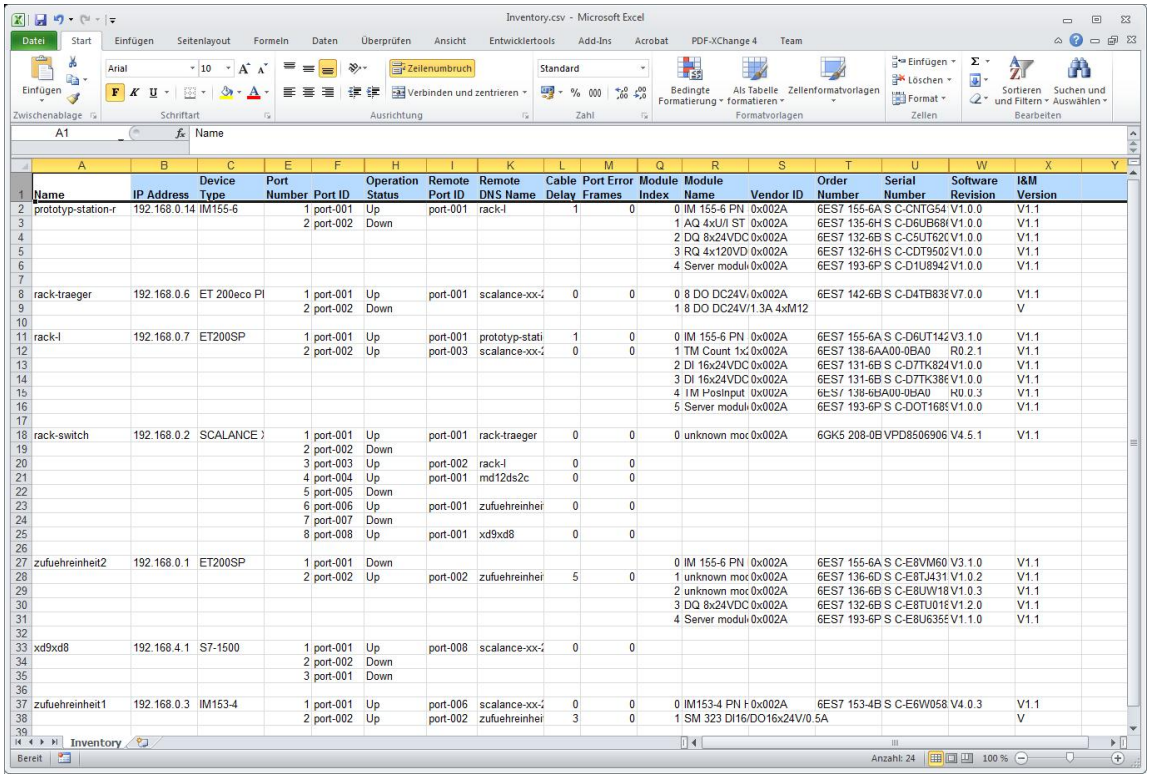
Device Inventory

A device inventory is a table of devices, exported from PRONETA in the form of a CSV-file which can be used with any spreadsheet software, like Microsoft Excel. This is useful to:

- Quickly establish the required hardware when a network configuration is to be duplicated, and to
- Document and easily reference information about the hardware employed in a certain installation.

The device inventory can be used to create a quick documentation of all plugged devices and modules, including detailed information like order number, firmware version and serial number.

Figure 3-13



The data fields contained in an inventory depend on the fields selected to be visible in the corresponding Device Table.

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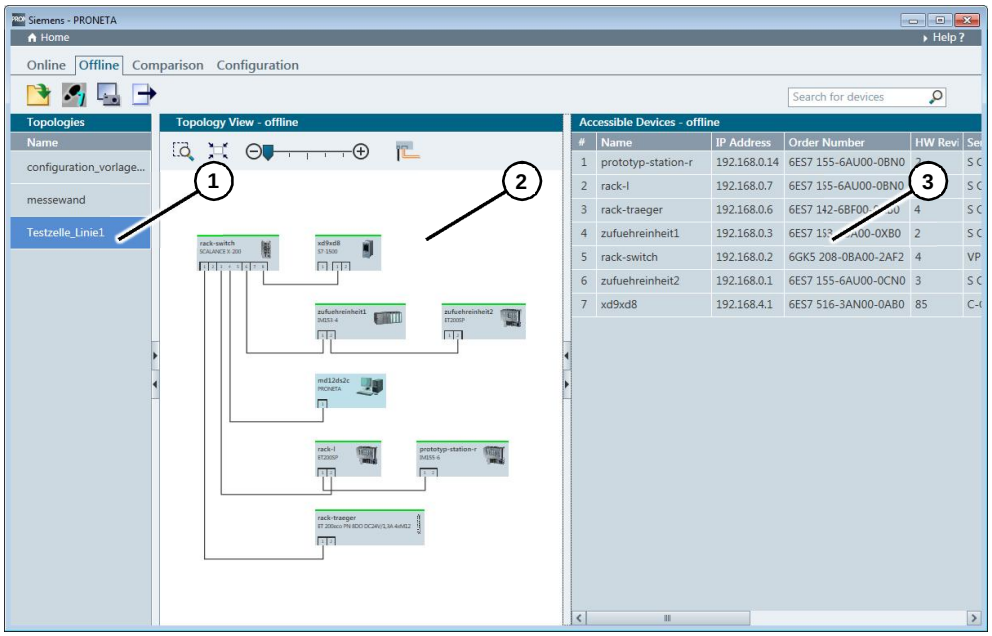
3.2.2 Offline Mode

Offline Mode allows you to examine a reference network which was previously stored to disk, in much the same manner as in Online Mode. The main difference is that, as the name implies, Offline Mode is strictly limited to reading operations and will never write to your devices.

Figure 3-14



The main screen is divided from left to right in:

- A Topology List (1) of previously stored reference networks
- A Topology View (2), and
- A Device Table (3) similar to the one in Online Mode which displays devices stored in the selected topology.

Function Bar

The following functions are available in the function bar:

Table 3-5

Icon	Function
	„Add topology file“: Loads a topology which has previously been stored to disk into the topology list.
	„Add topology from STEP 7 project“: Extracts the network topology from a STEP 7 project to the topology list (Supported STEP 7 Versions: 5.4 and 5.5)
	„Save Topology as picture“: Stores the selected network topology to disk as a bitmap image. (Supported formats: PNG, BMP, XPS)
	„Export device list“: Writes a file to disk (Format: CSV) which contains basic device information (name, type, IP configuration, status) as well as optional port and module data.

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Topology List

In this window as list of stored network topologies is displayed. Add more topologies through the commands in the function bar.

To remove an entry, right-click in the list and apply the “Remove File” command.

Selecting an entry from the list will display this topology in the Topology View.

Topology View

The topology view is a graphical display of the PROFINET network. For details on its operation, see Topology View in the Online Mode.

Tool Bar

In the top section of the Topology view, there is a tool bar with a variety of function icons:

Table 3-6

Icon	Function
	„Zoom selection“, lets you draw a rectangle inside the topology view. Once you release the mouse button, the view will zoom to display the rectangle area
	“Zoom fit to screen”, zooms the view back in a way that all network devices fit inside the view
	Zoom bar, zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on “-“ or “+”. (You can also zoom into and out of the topology view by placing the mouse over the view and using the scroll wheel.)
	“Show physical connection types”, indicates the transmission medium used in different color. (See Device Connection Types)

3.2.3 Comparison Mode

Comparison mode serves to compare two networks with each other – usually one will be the physical network as found during the network scans, and the other will be a reference network. The reference network in turn can be a saved topology file of a network scan, or a network as configured in a STEP 7 project.

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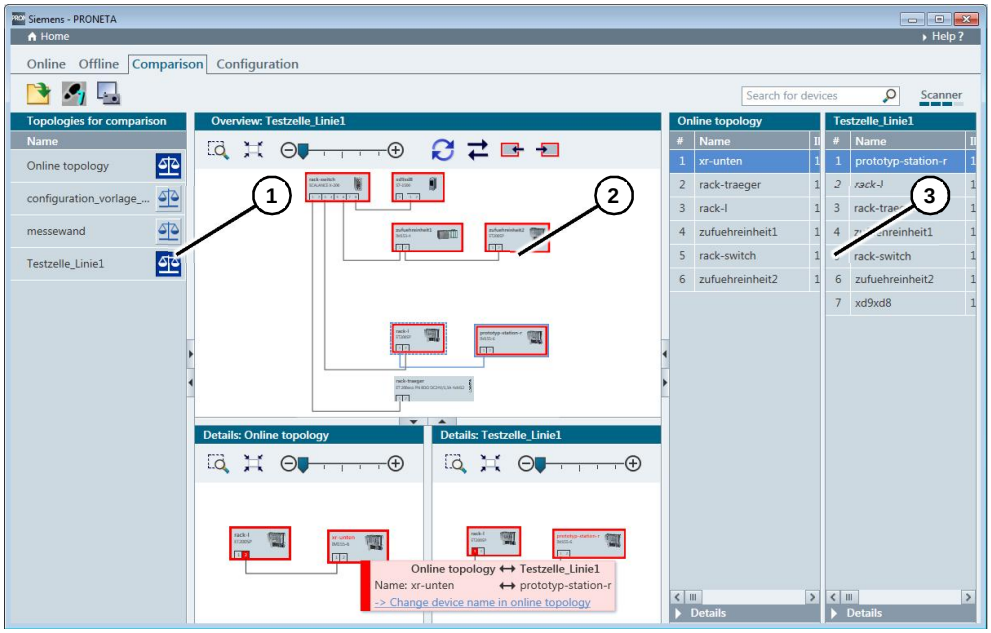
Figure 3-15



The main screen is divided into:

- A Topologies List (Comparison) (1) of “Topologies for comparison”
- A major (top) and two smaller (bottom) Topology Views (Comparison)(2)[1]
- Two Device Tables (3) with the devices stored in the selected topologies

Function Bar

The following functions are available in the function bar:

Table 3-7

Icon	Function
	„Add topology file“: Adds a topology which has previously been stored to disk to the topology list
	„Add topology from STEP 7 project“: “: Extracts the network topology from a STEP 7 project to the topology list (Supported STEP 7 Versions: 5.4 and 5.5)
	„Save topology as picture“: Stores the selected network topology to disk as a bitmap image. (Supported formats: PNG, BMP, XPS)

On the far right of the Function Bar, there is the Scanner Status Indicator.

Topology List

In this window as list of online topologies and stored network topologies for comparison is displayed. Add more topologies through the commands in the function bar.

To remove an entry, right-click in the list and apply the “Remove File” command.

[1] The smaller topology views are only created once you have clicked on one of the devices in the main topology view or the Device tables.

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To compare two of the list entries with each other, select both balance icons to the right of the respective topology names. The top entry will be displayed in the topology view and compared to the lower entry.

The list of topologies displayed here is retained between PRONETA sessions.

Topology View

The topology view is a graphical display of the PROFINET network, its devices and their connections to each other either during a current network scan or from a previously stored reference network.

Device Display

Devices with a red border deviate from their matches in the other network, or there is no match at all.

Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

Table 3-8

Icon	Function
	„Zoom selection“, lets you draw a rectangle inside the topology view. Once you release the mouse button, the view will zoom to display the rectangle area
	“Zoom fit to screen”, zooms the view back in a way that all network devices fit inside the view
	Zoom bar, zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on “-“ or “+”. (You can also zoom into and out of the topology view by placing the mouse over the view and using the scroll wheel.)
	“Refresh comparison”, starts a new scanner cycle of the network. (As opposed to the online mode, in comparison mode the topology view is *not* constantly updated.)
	“Change displayed topology in overview”, swaps the roles of of the first and the second network in the topology overview
	“Go to previous difference”, highlights the previous conflict in a comparison (if there is one)
	“Go to next difference”, highlights the subsequent conflict in a comparison (if there is one)

Topology Views “Overview” and “Details”

The larger, central view shows an overview of the top network chosen in the topologies list and its comparison to the second network.

In addition to the usual topology view display, a red border around a device icon indicates that differences between the corresponding device in the first and the second network exist. Hovering above such an icon brings up a popup with more details about the conflict.

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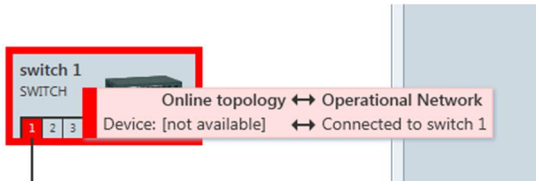
Figure 3-16



Differences may be the network configuration, module status etc. See Finding Differences in Comparison Mode for more details on when two devices are considered equivalent.

The view of the online topology is only refreshed when the corresponding symbol in the tool bar is clicked.

Below the central view are two topology detail views which highlight any device selected in the overview or the Device tables; the left detail view showing the configuration in the master topology, the right one showing the slave topology configuration.

Device Tables

On the right side of the comparison mode window there are two side-by-side Device tables. The left table lists the devices found in the first network, while the right table lists the devices of the second network.

Clicking on an entry in either table will focus the corresponding network in the topology views on this device.

Device Context Menu

By right-clicking on any device in a topology view or in the corresponding Device table, you can bring up a context menu with various functions.

Not all menu entries are available for all devices with the actual entries depending on the state of the device.

Table 3-9

Icon	Name	Function
	Flash LED	Sets the LEDs on the physical device to flashing for easy identification
	Reset selected	Resets *all* device parameters to factory defaults
	Use as starting point in graphical view	Centers the topology view on the chosen device

Finding Differences in Comparison Mode

When comparing network topologies, differences are determined based on:

- Device name
- Order number
- IP address
- Firmware version
- Attached modules (for ET200 devices only)
- Connections to other devices

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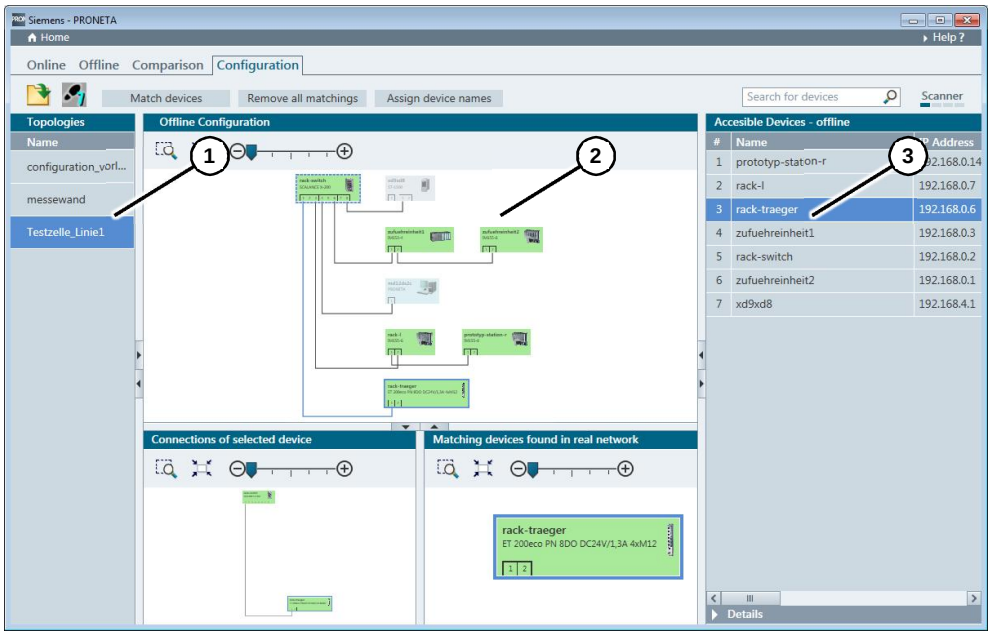
Note that this differs from Finding Differences in Configuration Mode.

3.2.4 Configuration Mode

The Configuration mode provides a semi-automatic mechanism to assign device names from a reference network to all or single devices on a physical network.

This provides a quick and reliable method to configure a large number of identical installations (like, a series of switching cabinets). The results can then be checked in the Comparison Mode, 3.2.3)

Figure 3-17



The main screen is divided into:

- A Topology List (1) of “Topologies for comparison”
- A major (top) and two smaller (bottom) Topology Views (2)[2]
- A Device Table (3) with the devices stored in the selected topology

Function Bar

The following functions are available in the function bar:

Table 3-10

Icon	Function
	„Add topology File“: Adds a topology which has previously been stored to disk to the topology list
	„Add topology from STEP 7 project“: “: Extracts the network topology from a STEP 7 project to the topology list (Supported STEP 7 Versions: 5.4 and 5.5)

[2] The smaller topology views are only created after you have clicked on one of the devices in the main topology view or the Device tables.

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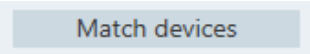
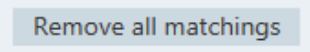
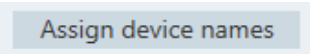
Icon	Function
	„Match devices“: Updates the comparison between reference network devices and physical devices; devices which are identical in both networks are displayed green.
	„Remove all matchings“: Clears the matching devices (green coloring) from the display. (Devices remain visible.)
	„Assign device names“: Writes the device names from all devices in the reference network, for which a match was found, to the corresponding devices in the physical network.

The last three commands have counterparts in the devices' context menues with the only difference that in the context menues, they don't operate on all devices of the network, but only on the selected device.

On the far right of the Function Bar, there is the Scanner Status Indicator.

Topology View

The topology view is a graphical display of the PROFINET network, similar in function to the Topology View in Online Mode.

Device coloring indicates the device's availability for configuration:

Table 3-11

Icon	Color	Meaning
	Greyed out	No match for this device in the reference network is found in the physical network
	Light grey	Matching has not yet been performed. For this device from the reference network one or more potentially matching candidates have been found in the physical network.
	Green	Matching has been performed. For this device in the reference network an unambiguous match has been found in the physical network.

Hovering the mouse pointer over a device will bring up Device Tool Tips with basic information about that device.

Tool Bar

In the top section of the view, there is a tool bar with a variety of function icons:

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Table 3-12

Icon	Function
	„Zoom selection“, lets you draw a rectangle inside the topology view. Once you release the mouse button, the view will zoom to display the rectangle area
	“Zoom fit to screen”, zooms the view back in a way that all network devices fit inside the view
	Zoom bar, zoom into the network or back by dragging the handle to the right or the left, respectively, or clicking on “-“ or “+”. (You can also zoom into and out of the topology view by placing the mouse over the view and using the scroll wheel.)

Device Context Menu

By right-clicking on any device in a topology view or in the corresponding Device table, you can bring up a context menu with various functions.

Not all menu entries are available for all devices with the actual entries depending on the state of the device.

Table 3-13

Icon	Name	Function
	Flash LED	Sets the LEDs on the physical device to flashing for easy identification
	Assign device name	Copies the name of the device from the reference topology to the physical network
	Remove matching	Clears matches from the topology view
	Use as starting point in graphical view	Centers the topology view on the chosen device

Device Table

This table lists the devices found either during your current network scan (online mode only), or in a stored reference network. Its operation is identical to the Device Table in Online Mode.

Finding Differences in Configuration Mode

In this mode, differences between devices are determined based on:

- Device ID
- Vendor ID
- Connections between devices

Note that this differs from how matches are being made in Comparison Mode – see Finding Differences in Comparison Mode.

3.3 IO Test Task

The IO test task serves to check the wiring of a distributed IO device even before installing a CPU, and to protocol the test results in a quick, error-free and simple manner. Test results can be saved and serve to document the correct wiring.

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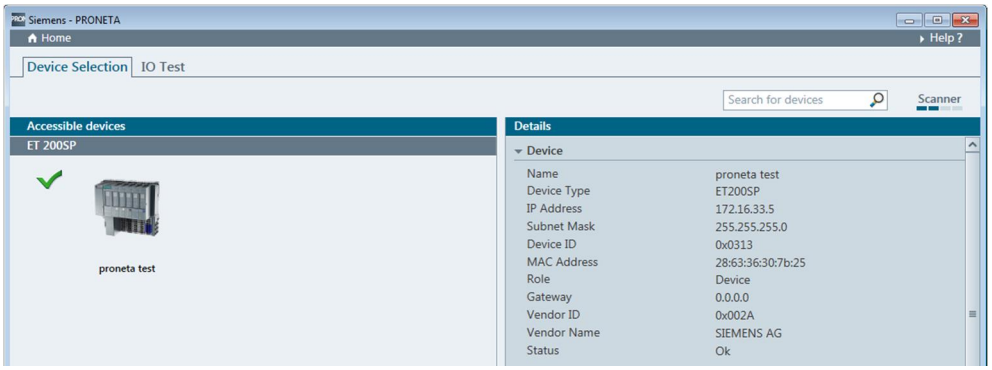
NOTE Due to the limitations of Microsoft Windows, PRONETA uses a cycle time of 256 ms for the communication in the IO test. This means that, if your installation introduces faster signal changes, these may go unobserved and may be missing in the IO Event Log, or will only show up intermittently.

Prior to the actual test, a device must be selected in Device Selection mode.

3.3.1 Device Selection Mode

In Device Selection mode, PRONETA shows a graphical display of all SIMATIC ET 200 devices which were found during the current network scan.

Figure 3-18



A green checkmark indicates that a device is available for IO Test (i.e. it has a valid IP address and device name). Select the device you want to test by clicking on it. In the right window section, a table with device details (type, network configuration, port and module configuration data, …) is displayed upon selection, and the selected device is displayed with a blue background.

To proceed to the IO Test after selecting a device as test candidate, double-click on the device, or select the “IO Test” tab in the mode bar..

3.3.2 IO Test Mode

In IO Test mode, the screen consists of two main views:

- “Device view” (1), a graphical representation of the tested device
- The “Details” table (2) which shows you additional information about the tested device and the test in general.

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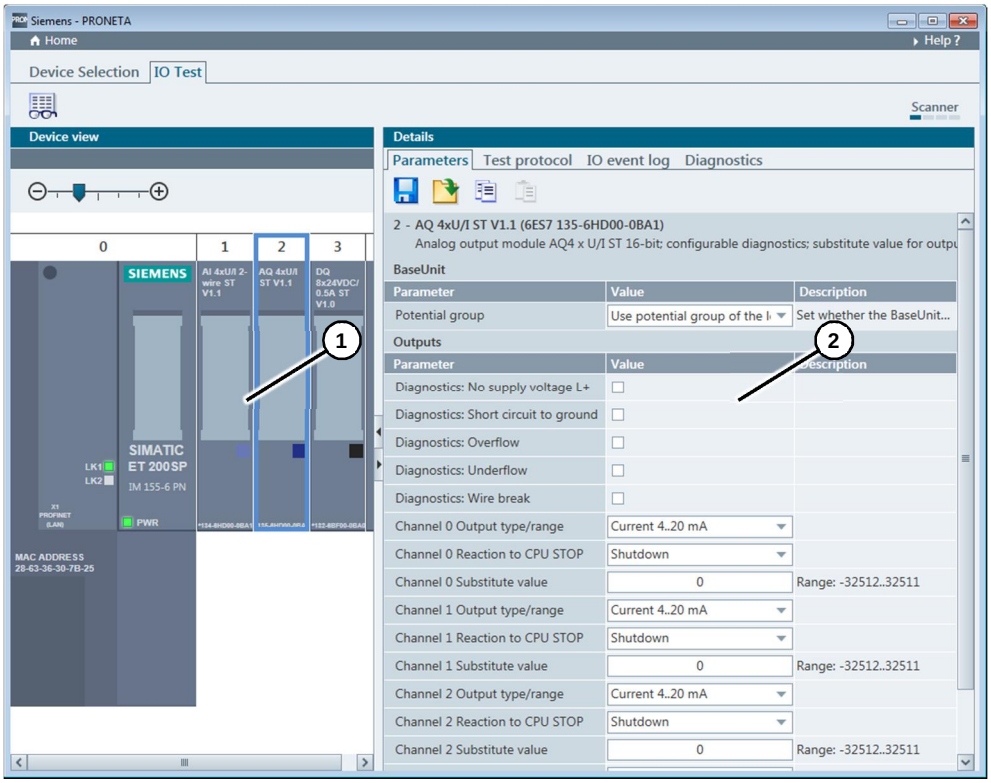
Figure 3-19



Function Bar

The following function is available in the function bar:

Table 3-14

Icon	Function
	“Force and monitor values”: Activates and deactivates control of the device through PRONETA for the IO test.

WARNING

Forcing inputs and outputs on control components can result in sudden movement of the machinery and the electrification of equipment.

Physical injury and electrical shock to personnel are consequently possible.

Make sure the machinery is in a safe state with no unauthorized personnel within range, before activating the IO test.

NOTE

To perform the IO test, PRONETA establishes a PROFINET application relation (AR) with the target device. Make sure that no other PROFINET controller occupies this connection.

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NOTE

The state of the IO test is indicated by the color of the “Device view” and “Details” view header bars:

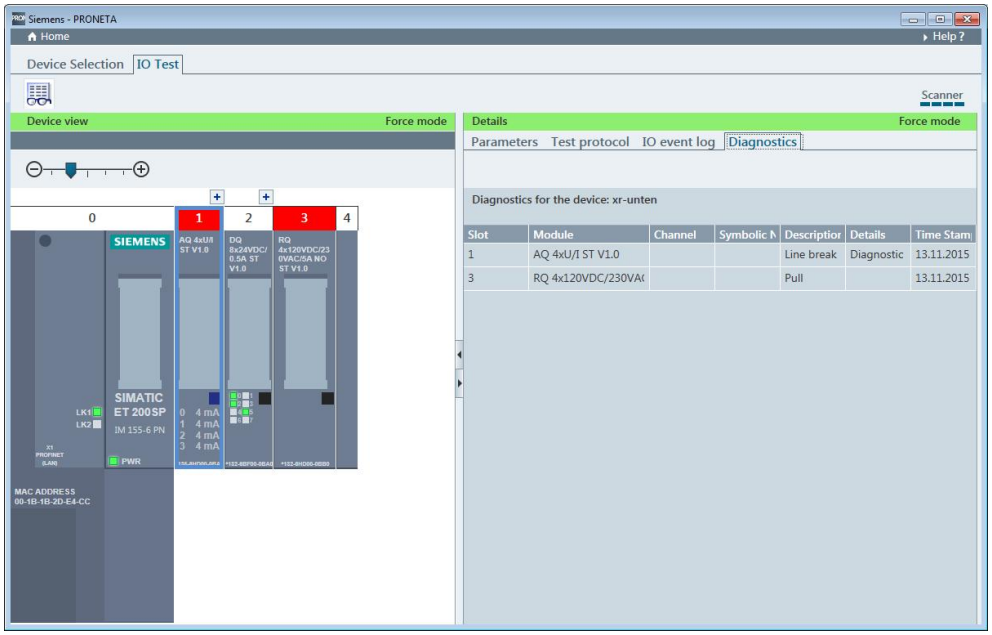
- Light green indicates the IO test is active
- Dark petrol indicates the IO test is inactive

Device View

Usage

The device view shows a graphical display of the device you selected for the IO test mode. The status and IO LEDs are updated in realtime to reflect the state of the device and should always correspond to the LEDs on the physical device.

Figure 3-20



To get a larger, simplified view of any module, click the “+” symbol above the module. A small Popup Window will appear.

Clicking on any of the modules here will show the module’s parameter table in the “Details” view, or highlight the corresponding section, depending on the tab chosen.

Modules with information in their diagnostics buffer are displayed with a red header.

Digital IO

Click on any LED symbol of an output module to toggle the status of the corresponding output. Likewise, voltage applied to any input should result in the corresponding input module LED lighting up.

Analog IO

Read analog values from input and output modules in the same fashion. To force analog values, use either the Popup Window or the “Test protocol” tab in the Details View.

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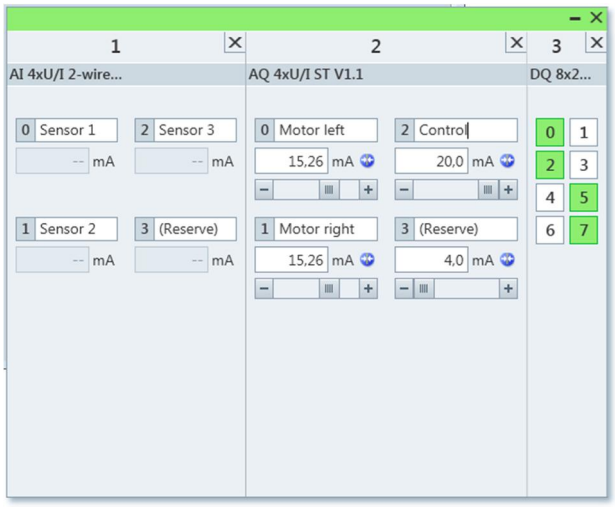
Popup Window (IO Test)

Usage

Above each module of the device in the Device View, a "+" symbol allows you to open a popup window with a larger symbolic view of the module's inputs and outputs. If you open several modules, their popups will be arranged in a row within a single window.

Figure 3-21



Click the close icon "×" in the top right of the popup window segment, or the "–" symbol above the module in the device view, to close the popup for this module again. To close the whole window, click the close icon "×" in the top right of the window. To rearrange the modules within the popup window, click the table header of the module in question and drag it to the desired position.

Digital IO

Digital inputs and outputs can be monitored and forced, respectively, by viewing or checking and unchecking the fields corresponding to their connections. Green fields indicate active lines.

Analog IO

For analog modules, symbolic channel names can be entered in the fields next to the indicated channel numbers. These will automatically be copied into the test protocol.

Analog output values can be forced by either entering the numeric value in the corresponding field, or by dragging the slider across the slider bar below. Clicking the blue dot symbol next to the field will reset the output to the default value.

Details View

The Details View consists of four tabs, each with its own function bar:

- Parameters to set the module parameters
- Test Protocol to perform and protocol the wiring test for the installation
- IO Event Log to monitor events like the changes of input and output values of a module
- Diagnostics to record system events like the pulling and plugging of modules.

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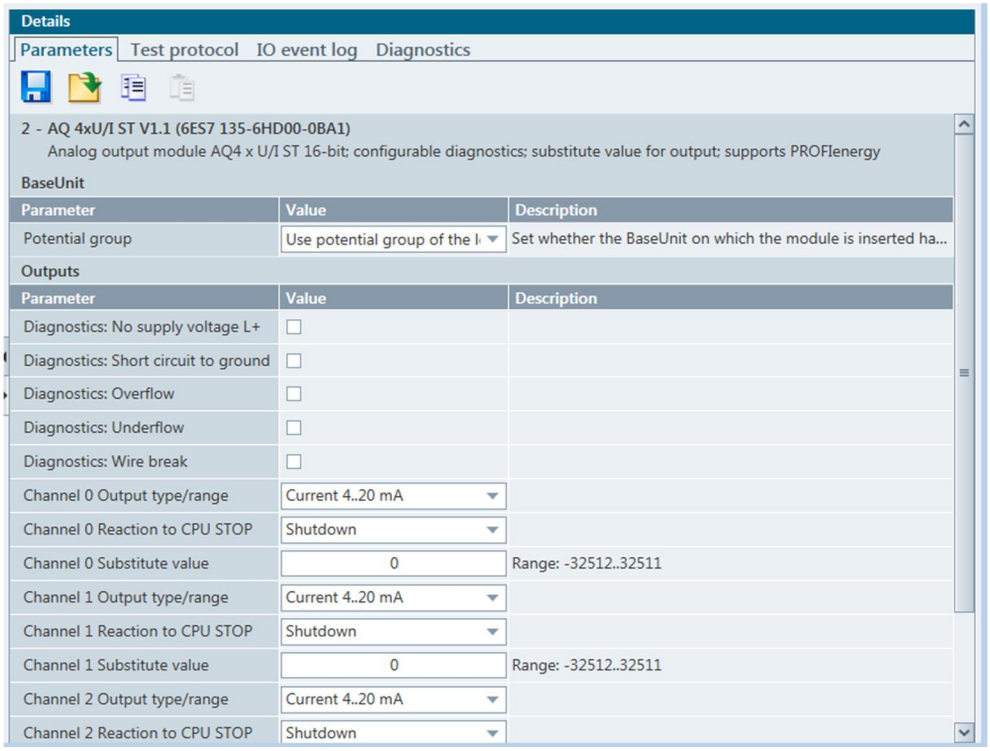
Parameters

This tab gives an overview over the parameter set of the module selected in the device view. Parameters can be edited as long as PRONETA doesn't force/monitor values.

Figure 3-22



The parameter set can be stored to a file on disk, loaded from a file, and copied to and pasted from the windows clipboard to "clone" the parameters to a different module. Parameters can only be edited while PRONETA is in "Force mode" (see IO Test Mode, section "Function bar").

Function Bar

The following functions are available in the function bar:

Table 3-15

Icon	Function
	"Save parameters": Saves the current parameter set of the whole device to disk.
	"Load parameters": Loads a previously saved parameter set from disk and assigns it to the current device.
	„Copy parameters": Copies the parameter set of the current module to the Windows clipboard.
	„Paste parameters": A previously copied module parameter set will be pasted from the Windows clipboard to the current device. The icon is greyed if the parameter set in the clipboard doesn't fit the selected module.

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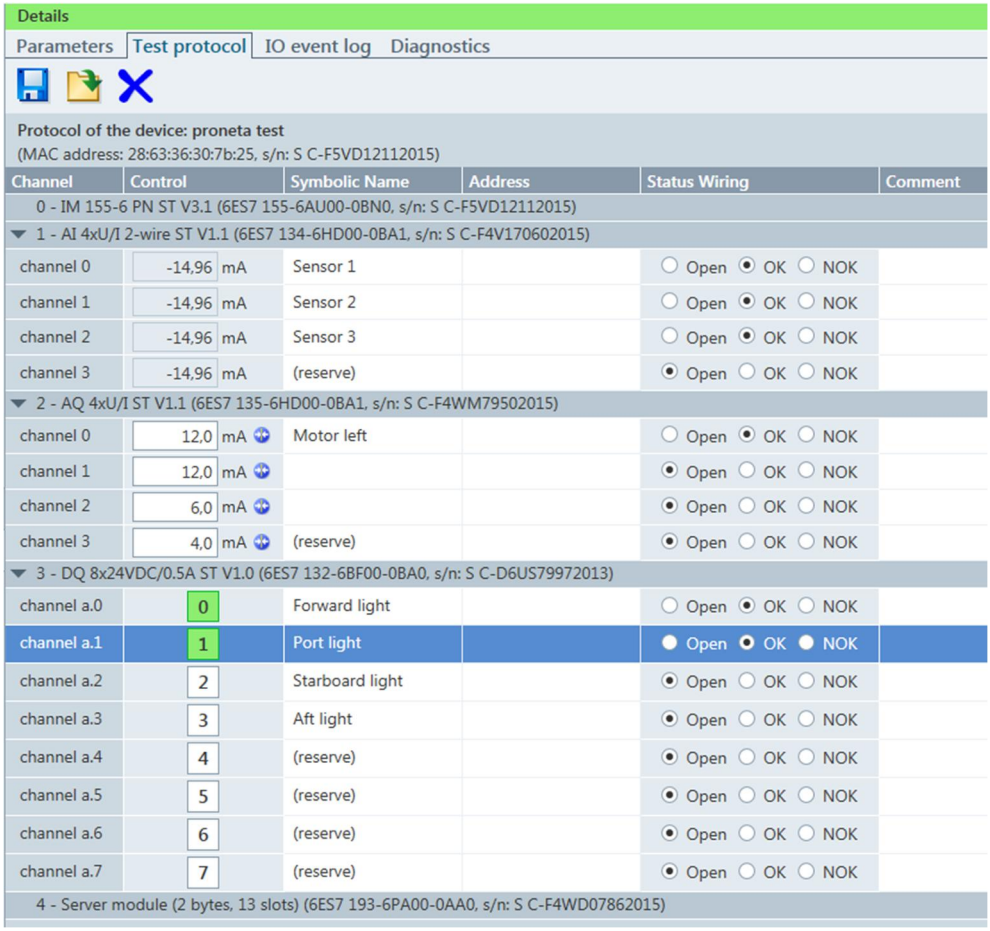
The commands “Save/Load parameters” transfer parameter sets between devices and are useful to configure a number of identical devices. Opposed to that, “Copy/Paste parameters” is used predominantely to “clone” module configurations within one device.

Test protocol

This tab offers the functionality for the actual IO test of the currently selected device.

Figure 3-23


Details
Parameters
Test protocol
IO event log
Diagnostics
Protocol of the device: proneta test
(MAC address: 28:63:36:30:7b:25, s/n: S C-F5VD12112015)
Channel
Control
Symbolic Name
Address
Status Wiring
Comment
0 - IM 155-6 PN ST V3.1 (6ES7 155-6AU00-0BN0, s/n: S C-F5VD12112015)
1 - AI 4xU/I 2-wire ST V1.1 (6ES7 134-6HD00-0BA1, s/n: S C-F4V170602015)
channel 0 -14,96 mA Sensor 1 Open OK NOK
channel 1 -14,96 mA Sensor 2 Open OK NOK
channel 2 -14,96 mA Sensor 3 Open OK NOK
channel 3 -14,96 mA (reserve) Open OK NOK
2 - AQ 4xU/I ST V1.1 (6ES7 135-6HD00-0BA1, s/n: S C-F4WM79502015)
channel 0 12,0 mA Motor left Open OK NOK
channel 1 12,0 mA Open OK NOK
channel 2 6,0 mA Open OK NOK
channel 3 4,0 mA (reserve) Open OK NOK
3 - DQ 8x24VDC/0.5A ST V1.0 (6ES7 132-6BF00-0BA0, s/n: S C-D6US79972013)
channel a.0 0 Forward light Open OK NOK
channel a.1 1 Port light Open OK NOK
channel a.2 2 Starboard light Open OK NOK
channel a.3 3 Aft light Open OK NOK
channel a.4 4 (reserve) Open OK NOK
channel a.5 5 (reserve) Open OK NOK
channel a.6 6 (reserve) Open OK NOK
channel a.7 7 (reserve) Open OK NOK
4 - Server module (2 bytes, 13 slots) (6ES7 193-6PA00-0AA0, s/n: S C-F4WD07862015)

The test table is vertically divided into sections according to the IO modules present. Each section can be collapsed and expanded again by clicking on the triangle symbol “►” in the section header.

The test table consists of the following columns:

- “Channel”: The name of the IO channel as determined by the device
- “Control”: Forcing status of the selected Output.
  Click on the icons the toggle the status of digital outputs, or drag or enter manually the value for analog outputs. Values entered will be immediately forwarded to the hardware. (For inputs, this field is greyed and inaccessible.)
  Alternatively, you can also force values by clicking on the LED representations of the device view, or by manipulating them in the popup window.
  This column is only visible while the test is active.)
- “Symbolic Name”: Arbitrary name, assigned by the tester to the channel. (See note below.)

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- “Address”: Arbitrary memory address to which the IO is mapped. (See note below.)
- “Status Wiring”: Here the actual results as established by the IO Test are entered by the tester. Select one of:
  - “Open”: Not tested yet (default)
  - “OK”: Test result correct, wiring in order
  - “NOK”: Test result wrong, faulty wiring.
- “Comment”

The values for “Symbolic Name” and “Address” serve only as memory aids for the tester. They are not part of the actual configuration of the device and are in no way checked for correctness.

The IO test can be suspended and resumed at a later point in time by saving and loading the protocol.

After completion of the test, the protocol can be stored to document the proper wiring of the device. (See the Function Bar for details.)

Function Bar

The following functions are available in the function bar:

Table 3-16

Icon	Function
	“Save protocol”: Stores the results of the current IO test to disk (format: CSV), either when the test is completed, or when the test is interrupted.
	“Load protocol”: Loads test results of an earlier IO test to proceed with testing.
	„Reset test protocol“: Discards the results of the current test and allows you to start over again. All results will be deleted from PRONETA.

IO Event Log

This tab records a log of all regular events (like changes of the values of inputs and outputs) which occurred to the modules while the IO test was active.

Clicking on a column header will sort the table accordingly.

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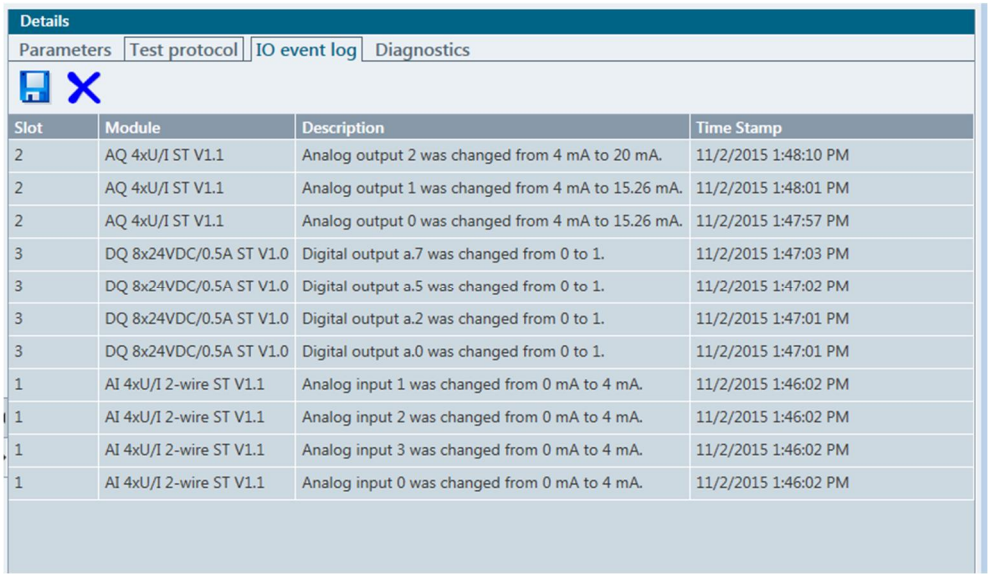
Figure 3-24



Slot	Module	Description	Time Stamp
2	AQ 4xU/I ST V1.1	Analog output 2 was changed from 4 mA to 20 mA.	11/2/2015 1:48:10 PM
2	AQ 4xU/I ST V1.1	Analog output 1 was changed from 4 mA to 15.26 mA.	11/2/2015 1:48:01 PM
2	AQ 4xU/I ST V1.1	Analog output 0 was changed from 4 mA to 15.26 mA.	11/2/2015 1:47:57 PM
3	DQ 8x24VDC/0.5A ST V1.0	Digital output a.7 was changed from 0 to 1.	11/2/2015 1:47:03 PM
3	DQ 8x24VDC/0.5A ST V1.0	Digital output a.5 was changed from 0 to 1.	11/2/2015 1:47:02 PM
3	DQ 8x24VDC/0.5A ST V1.0	Digital output a.2 was changed from 0 to 1.	11/2/2015 1:47:01 PM
3	DQ 8x24VDC/0.5A ST V1.0	Digital output a.0 was changed from 0 to 1.	11/2/2015 1:47:01 PM
1	AI 4xU/I 2-wire ST V1.1	Analog input 1 was changed from 0 mA to 4 mA.	11/2/2015 1:46:02 PM
1	AI 4xU/I 2-wire ST V1.1	Analog input 2 was changed from 0 mA to 4 mA.	11/2/2015 1:46:02 PM
1	AI 4xU/I 2-wire ST V1.1	Analog input 3 was changed from 0 mA to 4 mA.	11/2/2015 1:46:02 PM
1	AI 4xU/I 2-wire ST V1.1	Analog input 0 was changed from 0 mA to 4 mA.	11/2/2015 1:46:02 PM

Function Bar

The following functions are available in the function bar:

Table 3-17

Icon	Function
	“Save events”: Stores the event log to disc (format: CSV).
	“Reset IO event log”: Clears all entries from the current event log.

Diagnostics

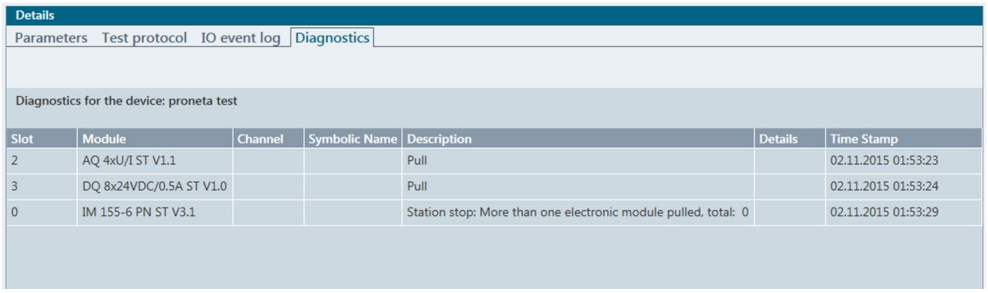
The table in this tab shows a record of all irregular events which occurred to the device while the IO test was active, like the pulling of modules or a signal wire break..

If the diagnostics buffer contains events pertaining to a module, the corresponding module header in the Device View will be displayed red.

Clicking on a column header of the table will sort the table accordingly.

Selecting a table entry will highlight the corresponding module in the Device View. In return, selecting a module in the Device View will highlight the first entry concerning the module in this table.

Figure 3-25



Slot	Module	Channel	Symbolic Name	Description	Details	Time Stamp
2	AQ 4xU/I ST V1.1			Pull		02.11.2015 01:53:23
3	DQ 8x24VDC/0.5A ST V1.0			Pull		02.11.2015 01:53:24
0	IM 155-6 PN ST V3.1			Station stop: More than one electronic module pulled, total: 0		02.11.2015 01:53:29

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The table consists of the following columns:

- “Slot”
- “Module”
- “Channel”
- “Symbolic Name” (as entered in the test protocol tab)
- “Description”
- “Details”
- “Time Stamp”

3.4 Settings

In the “Settings” window, there are three different tabs available:

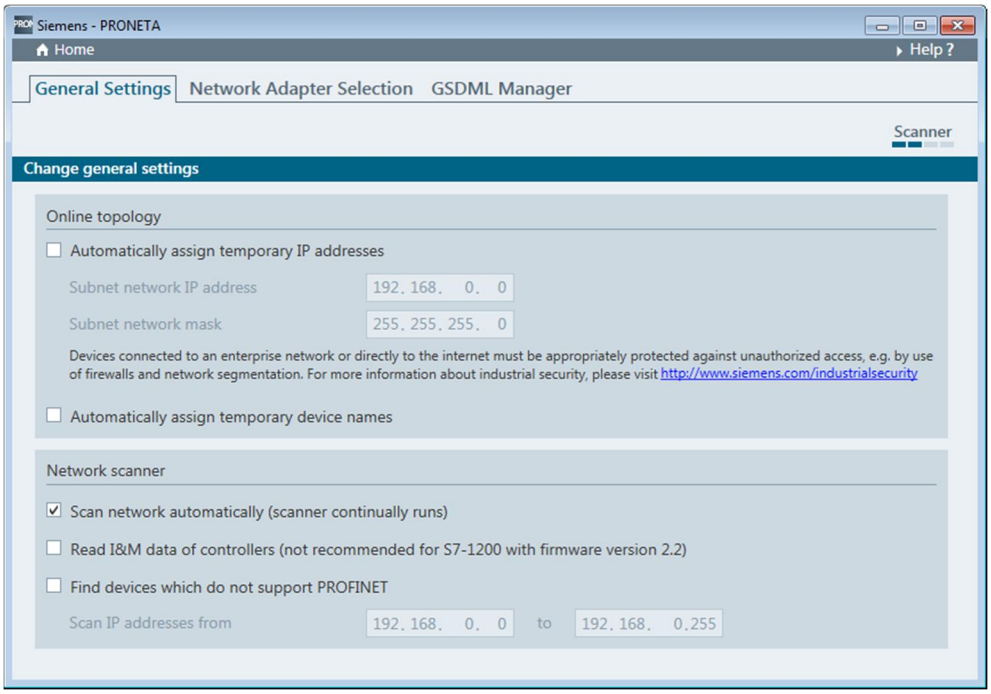
- “General Settings”
- “Network Adapter Selection”
- “GSDML Manager”

These modes are used to adjust the operational details of PRONETA.

3.4.1 General Settings

This mode allows you to set various parameters in connection with the network scan and visualization.

Figure 3-26


Siemens - PRONETA
Home
Help ?
General Settings
Network Adapter Selection
GSDML Manager
Scanner
Change general settings
Online topology
Automatically assign temporary IP addresses
Subnet network IP address
192. 168. 0. 0
Subnet network mask
255. 255. 255. 0
Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity
Automatically assign temporary device names
Network scanner
Scan network automatically (scanner continually runs)
Read I&M data of controllers (not recommended for S7-1200 with firmware version 2.2)
Find devices which do not support PROFINET
Scan IP addresses from
192. 168. 0. 0
to
192. 168. 0.255

- “Online topology”
  - “Automatically assign temporary IP addresses”,
  - “Automatically assign temporary device names”:
    Checking either entry will ensure that all devices which are found during a network scan will automatically have valid IP addresses and/or device

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names assigned to them. The IP addresses will be taken from the subnet defined by “Subnet network IP address”, and the devices will receive the subnet mask from the respective field.
IP addresses and device names are lost when the respective device is powered off.

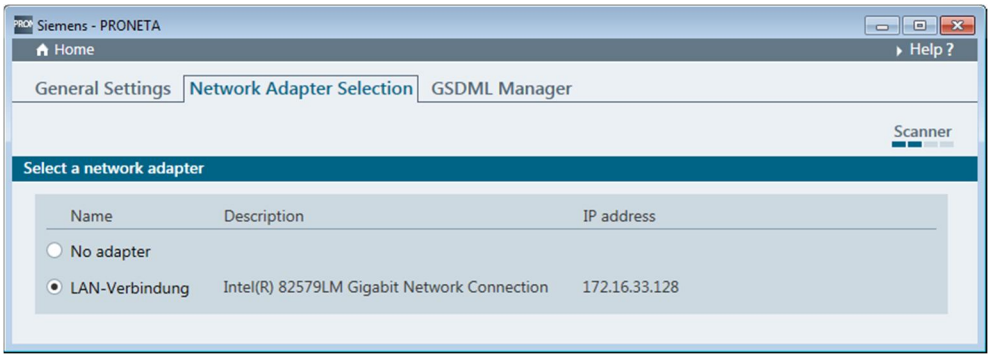
- “Network scanner”
  - “Scan network automatically (scanner continually runs)”:
    If this entry is checked, the scanner will be permanently active, unless specifically stopped. (To do this, use the Scanner Status Indicator’s context menu.)
    This results in a constantly up-to-date representation of the physical network, but also creates higher traffic loads and may lead to problems with time-critical communications on the network.
  - “Read I&M data of controllers (not recommended for S7-1200 firmware version 2.2)”:
    A PLC may provide additional “Identification and maintenance data”, like order number of firmware version. .
  - “Find devices which do not support PROFINET”:
    PRONETA can also poll the network for devices which do not support the full PROFINET standard. “Scan IP addresses from … to” gives the range of network addresses that PRONETA will scanning cycle during a poll for these devices.
    Using this option and giving large address ranges may result in higher response times of PRONETA and increased network load.

NOTE Changes introduced here will take effect as soon as you select a different tab or return to the Home screen. You will not be asked for a confirmation of parameter changes introduced here.

3.4.2 Network Adapter Selection

This mode lets you change the network adapter used for PRONETA.

Figure 3-27



A list of Ethernet adapters found on your PC is displayed, chose the appropriate device from here.

If no adapter is selected, you can only use offline functionality with PRONETA, which are the Offline Mode in Network Analysis, and the Comparison Mode when comparing two offline topologies.

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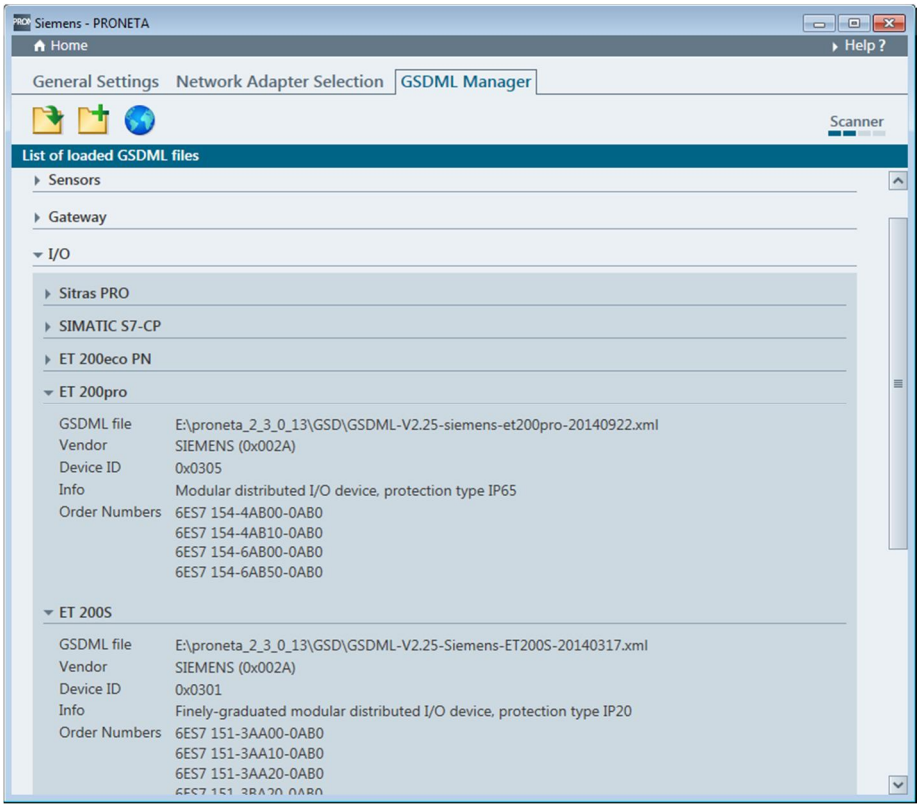
3.4.3 GSDML Manager

GSDML files (“General Station Description Markup Language”) contain information about the features and capabilities of PROFINET I/O devices, like the number of interfaces or supported baudrates.[3] PRONETA comes already with a large number of GSD files preinstalled. With the GSDML manager you can include support for further devices, and for devices which were only released after the latest PRONETA version.

Figure 3-28



On the top of the screen, the following functions are available from the function bar:

Table 3-18

Icon	Function
	„Add GSDML file“: Lets you add a single GSD file from disk. Clicking on the icon opens a file browsing dialogue.
	„Add GSDML folder“: Lets you add several GSD files in one action by simply designating a folder where the individual GSD files are stored. Clicking on the icon opens a file browsing dialogue.
	“Download GSDML files for SIEMENS devices”: Will launch a web browser and establish a connection to the SIEMENS internet support portal where you can download additional GSD files, e.g. for new devices.

[3] Strictly speaking the file is of type „GSD“, and „GSDML“ denotes the markup language in which the GSD file is written.

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4 Working with PRONETA

This chapter gives you a short introduction into different use cases for PRONETA and then leads you through the individual steps to complete your configuration tasks successfully.

The main use cases for PRONETA are:

Table 4-1

Use Case	Chapter
Give an overview of all PROFINET devices, their configuration and connections in a network	4.2, Displaying the nodes and topology of a PROFINET network
Compare a previously configured topology and the actual physical topology with each other	4.3, Comparing and configuring different topologies
Configure devices, and transfer data from a previously saved topology or a STEP 7 project file automatically or manuallyto a different network	4.4, Configuration of the PROFINET nodes
Automatically collect information about all devices and components installed in a network, and write a comprehensive report of all relevant data to disk	4.5, Creating an inventory of the network
Control the distributed I/O for correct wiring and log the test results to document the plant status	4.6, Testing the correct wiring of the distributed I/O

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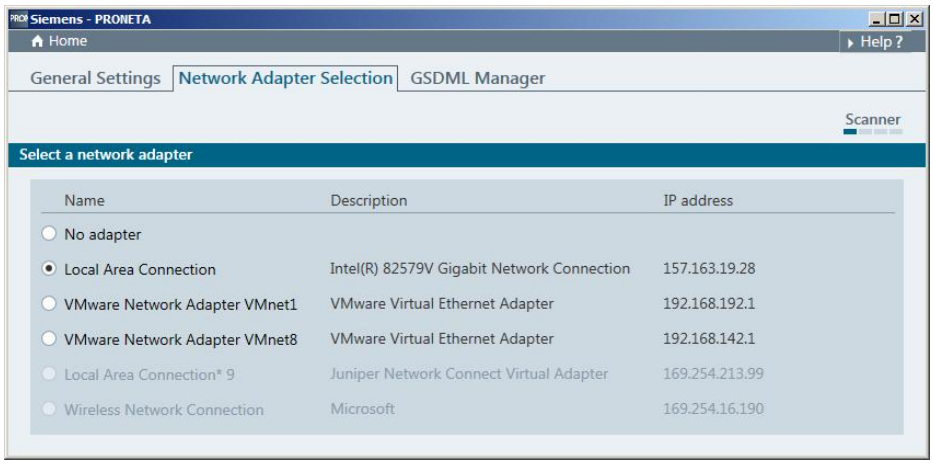
4.1 Selection of the PRONETA Network Adapter

Before you can work with PRONETA, the network adapter which connects you to the PRONETA network should be selected. To do so, select the command Network Adapter Selection from the Settings task (3.4.2), or from the Scanner Status Indicator context menu.

Figure 4-1



If you do not select a particular adapter, PRONETA will try to reconnect to the adapter used in the previous PRONETA session.

If no network adapter is available, PRONETA provides offline functionality only (i.e. Offline Mode and Comparison Mode in the Network analysis task).

4.2 Displaying the Devices and Topology of a PROFINET Network

Task

All devices of a physical PROFINET network are to be detected. The relevant information – IP addresses, device names, port connections etc. – are displayed in a graphical Topology view.

If required, the network configuration is to be adapted.

Implementation

1. Start PRONETA and select the Network Analysis Task (3.2).
2. Select the Online Mode (3.2.1) to get a display of all connected and active devices.

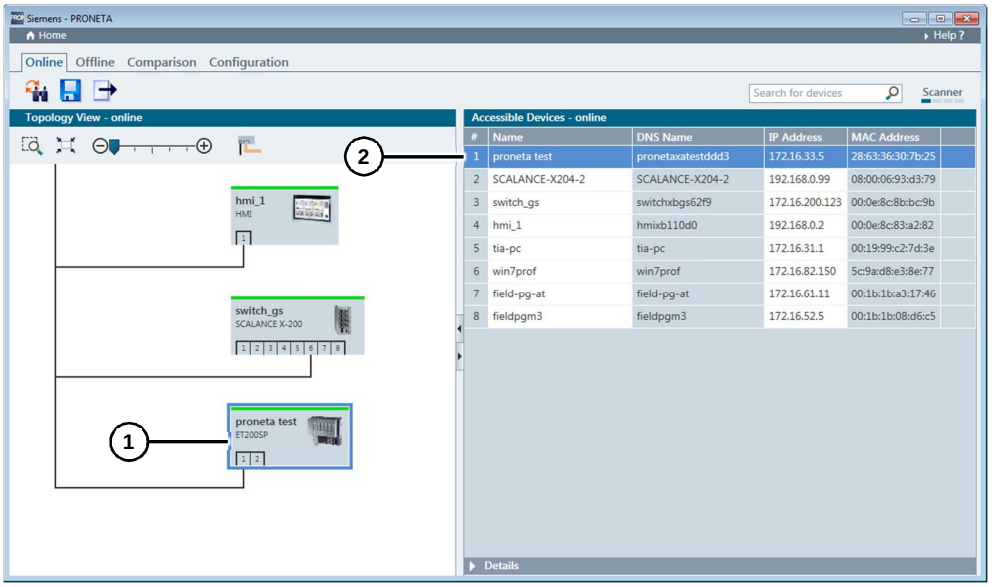
NOTE

Wait until the online scan has found all network devices. This takes a full cycle of the Scanner Status Indicator display.

Depending on the network topology, utilization and size, this can require between a few seconds and a few minutes.

3. Select a device by a single mouse-click on the left side in the Topology View (1) or in the Device Table (2) on the right side.

Figure 4-2



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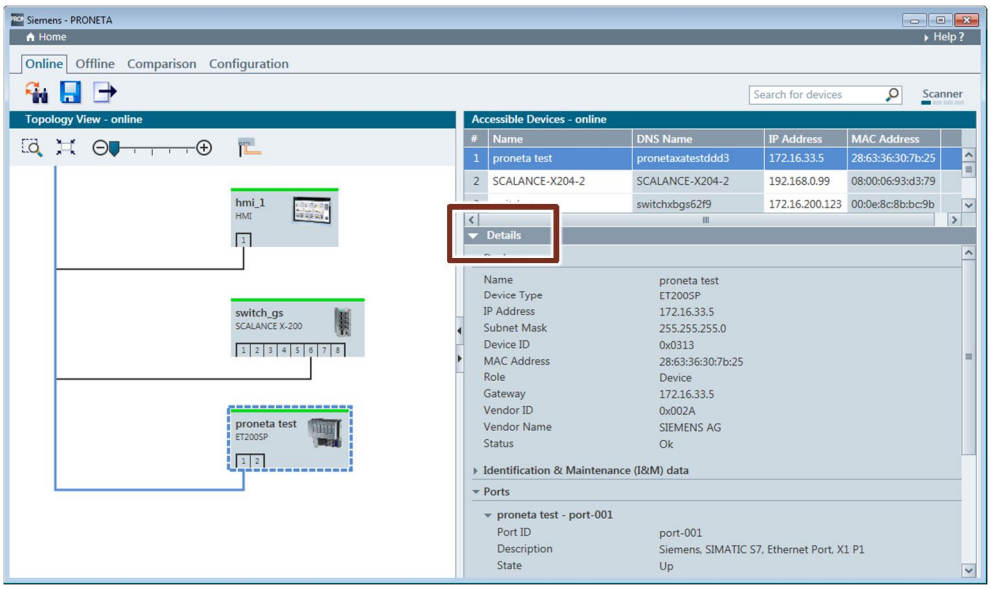
4. Open the details view in the right lower part of the device table to get information about the configuration of the device.

Figure 4-3



5. If necessary, change the configuration (IP address, device name) in the Device Context Menu, or with a double-click on the device in the Topology view.

Figure 4-4

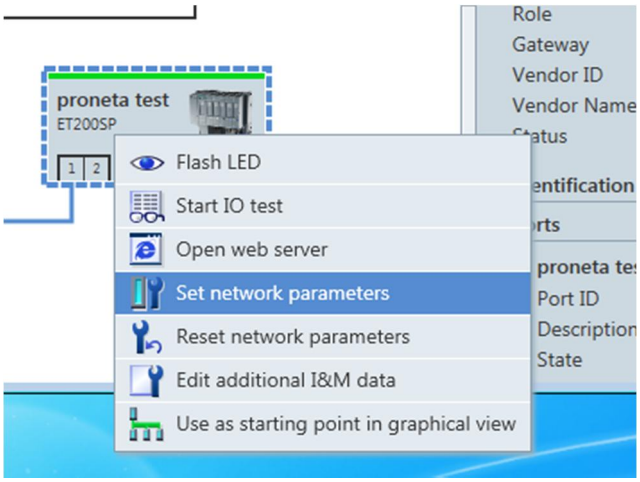


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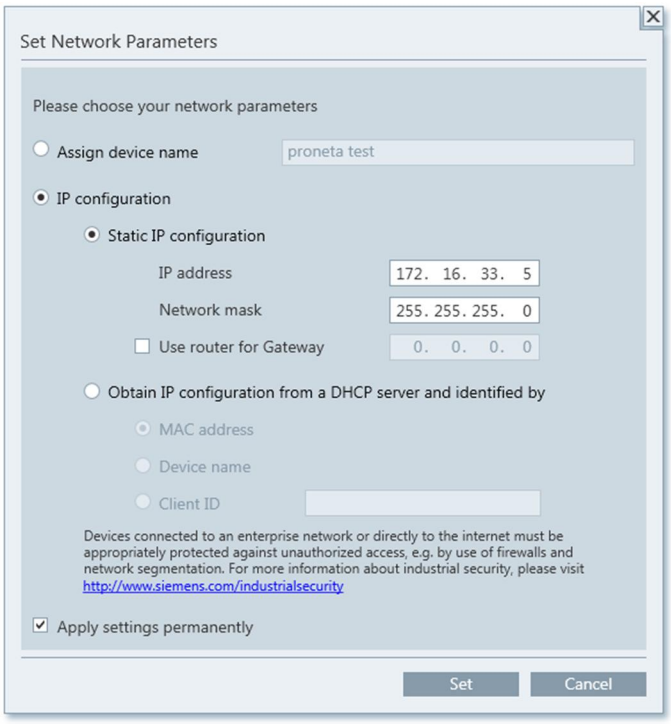
Figure 4-5


Set Network Parameters
Please choose your network parameters
Assign device name
proneta test
IP configuration
Static IP configuration
IP address
172. 16. 33. 5
Network mask
255. 255. 255. 0
Use router for Gateway
0. 0. 0. 0
Obtain IP configuration from a DHCP server and identified by
MAC address
Device name
Client ID
Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit
http://www.siemens.com/industrialsecurity
Apply settings permanently
Set
Cancel

4.3 Comparing and Configuring Different Topologies

Task

It is to be checked whether the physical layout of a PROFINET network matches the specified reference project.

This is particularly useful if, e.g. a number of identical machines or control cabinets are to be commissioned.

NOTE This use case covers the network configuration, i.e. topology, devices, modules, and IP parameters.

To survey the wiring of the IO modules, refer to Testing the correct wiring of the distributed I/O (4.6)

Comparing Networks

1. Start PRONETA and select the Network Analysis Task (3.2).
2. Select the Comparison Mode (3.2.3).
3. In addition to the automatically generated Online topology, load one or several reference Topology Files with the help of the function bar icons “Add topology File” (1) or “Add topology from STEP 7 project” (2). The reference files may have been previously saved with PRONETA (see 3.2.1, Online Mode), or configured with STEP 7.

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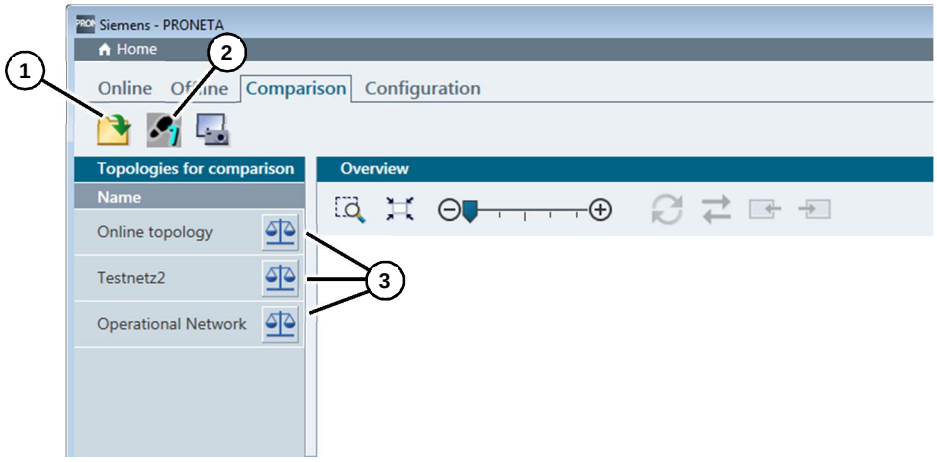
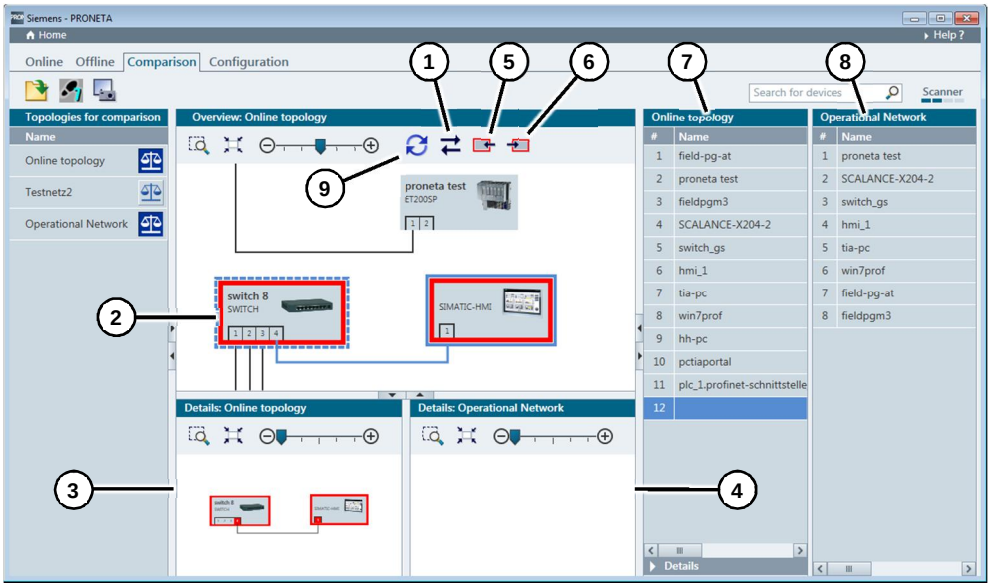
Figure 4-6



4. By clicking on their respective balances symbols ((3) above), select *two* entries from the table of “Topologies for comparison” which you would like to compare with each other.

The chosen topology with the highest position in the topology list– usually the physical network or “Online topology” – will be displayed in the[Topology View "Overview"](), and compared against the second chosen topology. If you select more than two topologies, the first selected entry will be dropped from the comparison.

Figure 4-7



To swap the roles between the “top” and the “bottom” topology, click the “Change topology displayed” icon in the tool bar (1). Any devices in the network which are “mismatched”, i.e. which do not match their counterpart in the other network (or which have no counterpart at all), will be displayed with a red border (2).

Clicking on any device brings up two smaller topology views on the bottom of the screen, with the left view (3) displaying the configuration and neighbors for the respective device in the first topology, and the right one (4) displaying the corresponding information from the second network. Use the “Go to Previous Difference” (5) and “Go to Next Difference” (6) icons from the tool bar to systematically proceed through all conflicts found.

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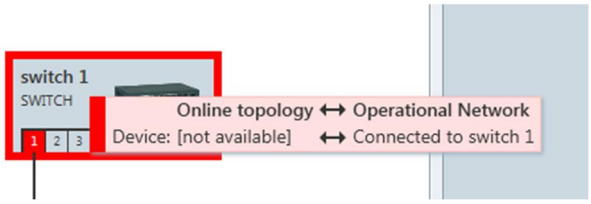
In the right section of the screen, two device tables are presented for the first (7) and second selected network (8), respectively. Click the “Refresh” icon (9) to update the topology view.

In the bottom details views, hovering over a mismatched device will bring up a Tool tip with detailed information about the differences.

Figure 4-8



To assign changes to the network devices, proceed with 4.4, Configuration of the PROFINET nodes.

4.4 Configuration of the PROFINET Devices

Task

Various basic configuration tasks are to be performed on the PROFINET devices, without using any other engineering software like STEP 7 or the TIA Portal.

The details of the various tasks are:

Table 4-2

	4.4.1 Automatic PROFINET Device Configuration	4.4.2 Manual Configuration of a Single Device	4.4.3 Transfer of the Device Name for a Single Device	4.4.4 Transfer of Device Names for a Whole Network
Parameters	IP address, name	IP address, name	Name	Name
Scope	All devices	Single device	Single device	All devices
Lifetime	Temporary	Temporary/Permanent	Permanent	Permanent
Mode	Automatic	Manual	Manual	Automatic

4.4.1 Automatic PROFINET Device Configuration

Task

All devices of the PROFINET network are to be “named”, i.e. given a temporary IP address and/or a temporary device name.

Implementation

PRONETA can generate missing IP addresses or device names for all accessible devices and assign them to the devices automatically.

1. Select the Settings (3.4) in the start screen, entering the General Settings (3.4.1).
2. In the following screen:
   - To assign an automatically generated IP address to all accessible “unnamed” devices, put a check-mark next to “Automatically assign temporary IP address” (1). The addresses generated in this way are from the subnet range given below (2).

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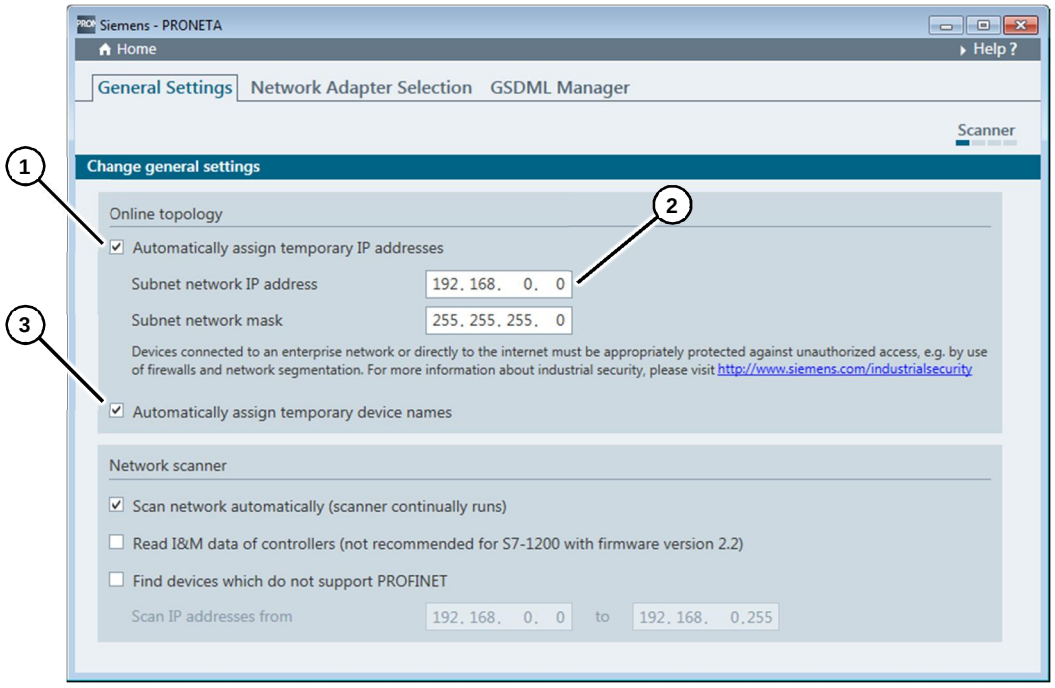
– To assign an automatically generated device names to all accessible “unnamed” devices, put a check-mark next to “Automatically assign temporary device names” (3).

Figure 4-9


Siemens - PRONETA
Home
Help ?
General Settings
Network Adapter Selection
GSDML Manager
Scanner
Change general settings
1
2
3
Online topology
Automatically assign temporary IP addresses
Subnet network IP address
192. 168. 0. 0
Subnet network mask
255. 255. 255. 0
Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity
Automatically assign temporary device names
Network scanner
Scan network automatically (scanner continually runs)
Read I&M data of controllers (not recommended for S7-1200 with firmware version 2.2)
Find devices which do not support PROFINET
Scan IP addresses from
192. 168. 0. 0
to
192. 168. 0.255

NOTICE	If you set the respective check-marks, the naming of the device is carried out automatically for all accessible unconfigured devices as soon as you leave the view. You will not be asked for any further confirmation.

The temporary IP addresses/device names that have been assigned this way remain valid until the devices have run through a reset, or have been disconnected from the voltage supply.

NOTE	The use of temporary device configurations is convenient in the case of using PRONETA to prepare a network before a CPU is installed on it, when later the CPU will assign permanent device configurations to the single devices.

4.4.2 Manual Configuration of a Single Device

Task

A single PROFINET device is to be assigned a set of temporary or permanent network parameters manually.

Implementation

To write arbitrary configuration values to an single device, proceed as follows:

1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).

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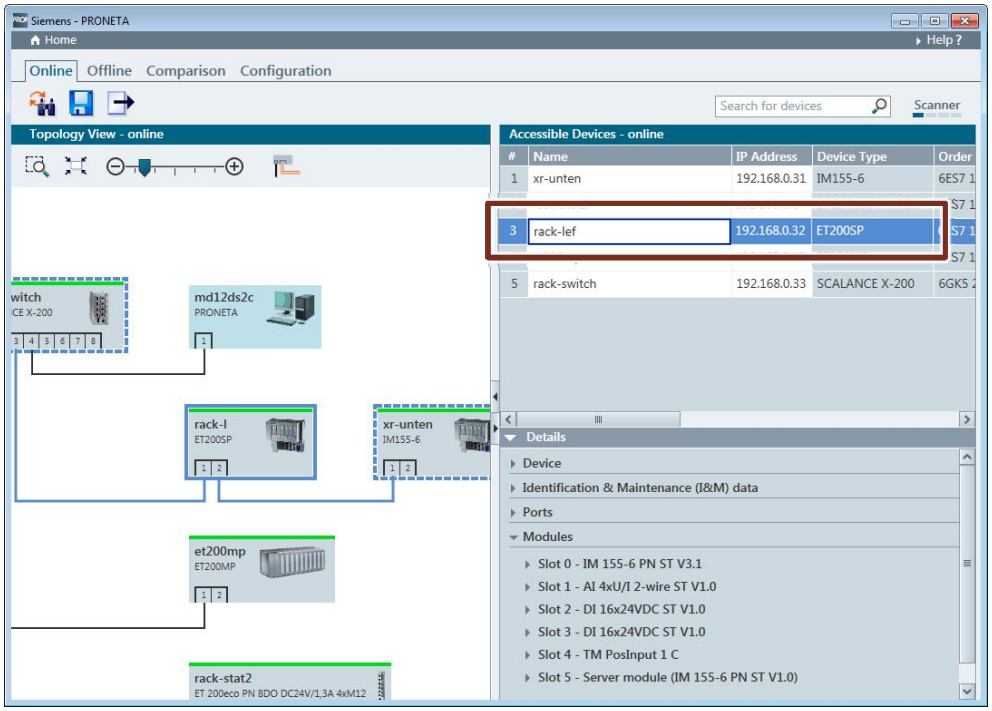
2. Highlight the device in the Topology View or the Device Table, and open the Device Context Menu with the right mouse button.
3. Select the command “Set Network Parameters”.
4. Set the desired device parameters in the Set Network Parameters dialog that opens up.

The new values can be temporary or permanent, depending on the settings in the parameters dialog.

Or alternatively:

1. In the Network Analysis Task (3.2), select the Online Mode (3.2.1).
2. In the Device Table, enter the new values directly. All editable fields are distinguished by a white background.

Figure 4-10



4.4.3 Transfer of the Device Name for a Single Device

Task

The device name of a single network device from a reference network is to be written to one particular device found in the physical network.

Implementation

1. In the Network Analysis Task (3.2), select the Configuration Mode (3.2.4).
2. Open a reference topology with the appropriate icons from the function bar. You may load:
   a. A topology file you created and saved earlier with PRONETA (1), or
   b. The topology information extracted from a project created with STEP 7 (2).

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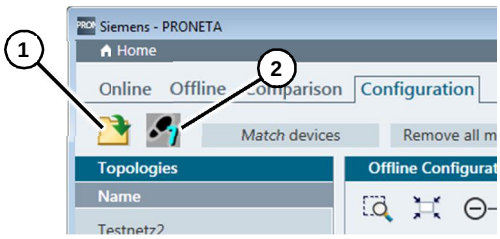
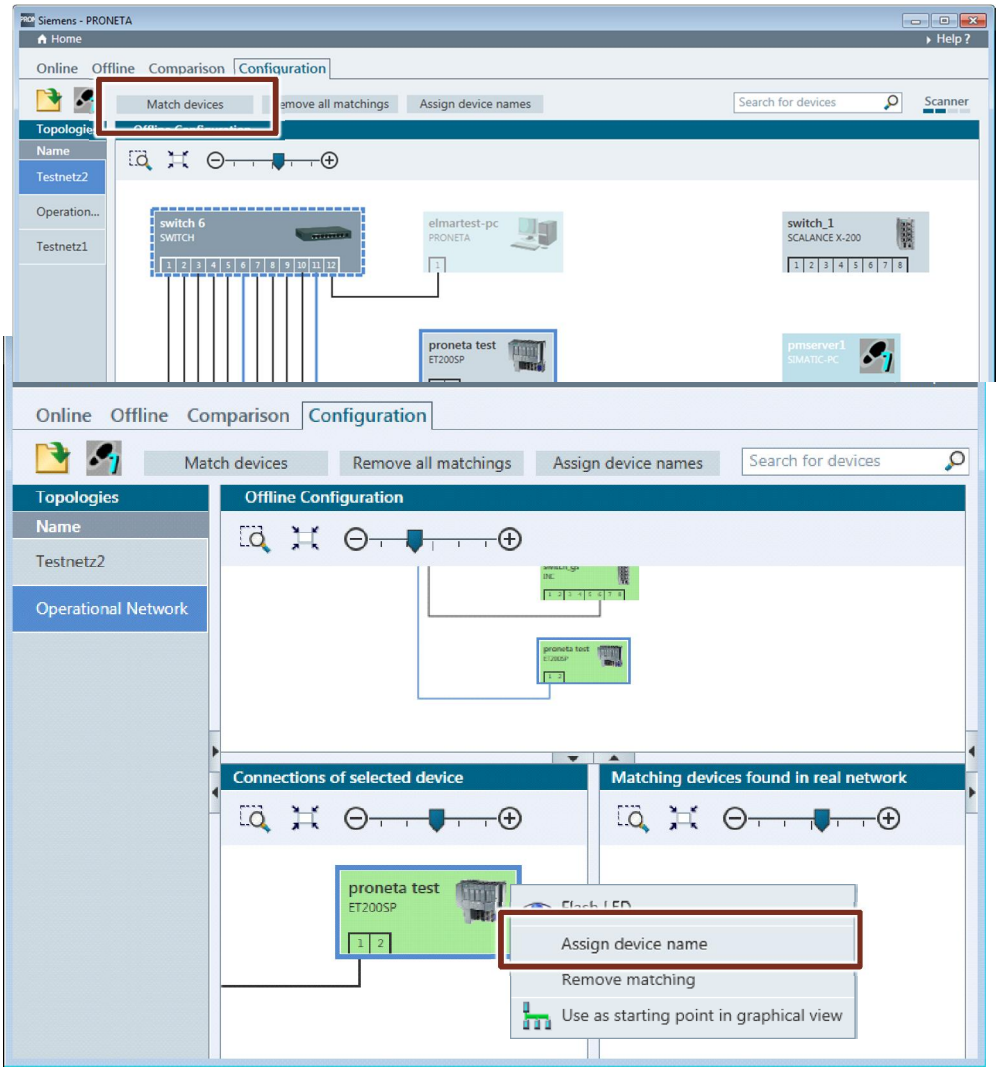
Figure 4-11



3. Use the button “Match devices” to see for which devices of the reference network there is a match in the physical network.

Figure 4-12



A new device name from the reference network will be permanently assigned to the device.

NOTE

After the manual device configuration, the refreshed parameters are not displayed in the “Accessible Devices” list immediately, but only during the next scan cycle. This can take between a few seconds and a few minutes.
To refresh the table immediately, carry out a manual refresh.

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4.4.4 Transfer of Device Names for a Whole Network

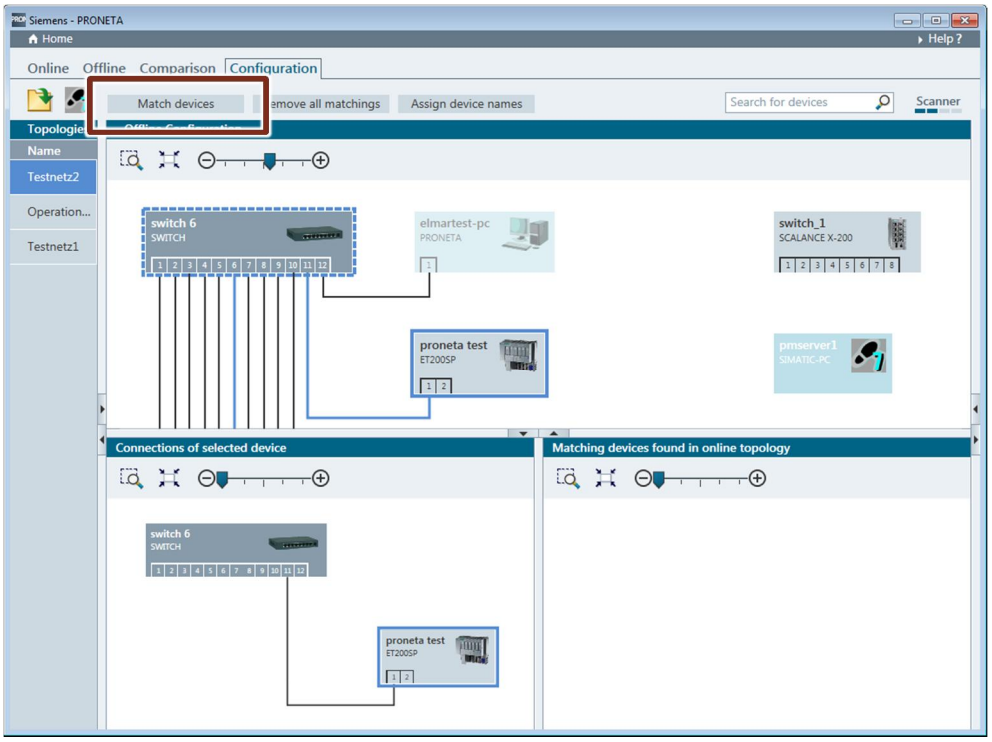
Task

Device names from an existing topology file or STEP 7 project are to be assigned to all devices on the physical networks for which matches are found. (“Device naming”)

Implementation

1. In the Network Analysis Task (3.2), select the Configuration Mode (3.2.4).
2. With the appropriate icons from the function bar, load
   a. a network topology file you created and saved earlier with PRONETA, or
   b. topology information extracted from a project created with STEP 7.
3. In the Offline Topology View, light grey devices have one or more matching physical devices.
   Use the button “Match devices” to see for which devices of the reference network unique matches in the physical network exist. Only devices in the physical network with a valid IP address will be considered.
   See Finding Differences in Configuration Mode for precise criteria on how matches are established.

Figure 4-14



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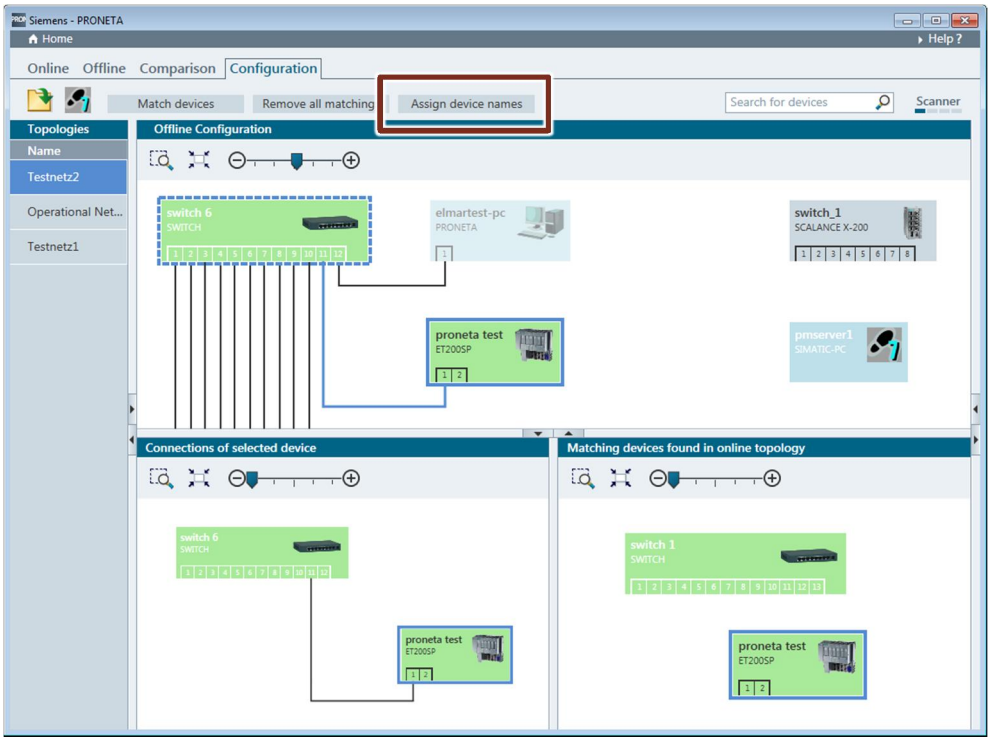
4. All devices for which matches have been found are displayed green.
   To carry out the naming for all these devices automatically, click the “Assign device names” button.

Figure 4-15



4.5 Creating an Inventory of the Network

Task

A detailed inventory of all network devices used in a physical network is to be created.

Implementation

1. In the Network Analysis Task(3.2), select the Online Mode (3.2.1).
2. Wait until a complete network scan cycle has been completed as shown by the Scanner Status Indicator.
3. Click the “Export Device List” icon from the function bar to create a file in CSV format on disk.

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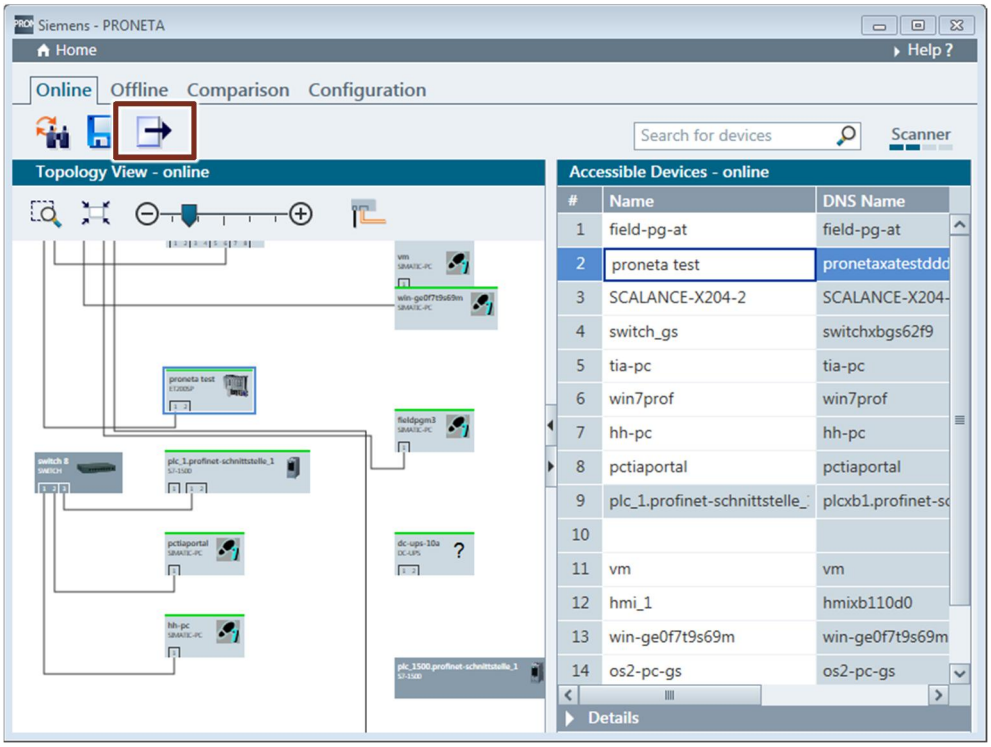
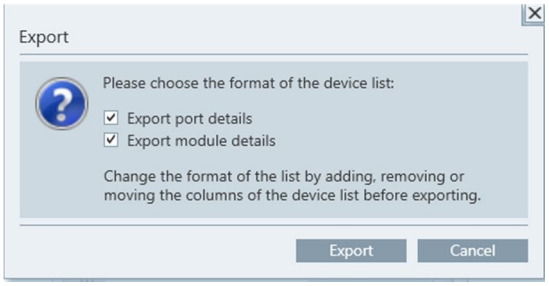
Figure 4-16



4. In the following dialogue, select whether you want to add port and/or module information in the inventory to store the complete hardware configuration of all devices.

Figure 4-17


Export
Please choose the format of the device list:
Export port details
Export module details
Change the format of the list by adding, removing or moving the columns of the device list before exporting.
Export
Cancel

Port details will contain information about the connection partner on the port. Module information comprises I&M data for all I/O modules installed.

The information saved in the Device Inventory is the same as currently displayed in the Device Table. To filter the inventory data, activate or deactivate individual columns in the Devices Table by right-clicking on the column header in the table and selecting the relevant parameters.

Thus, it can be ensured that not only the device type, module structure, IP addresses etc. are saved into the Device list, but also information such as the version of the installed firmware, serial numbers etc.

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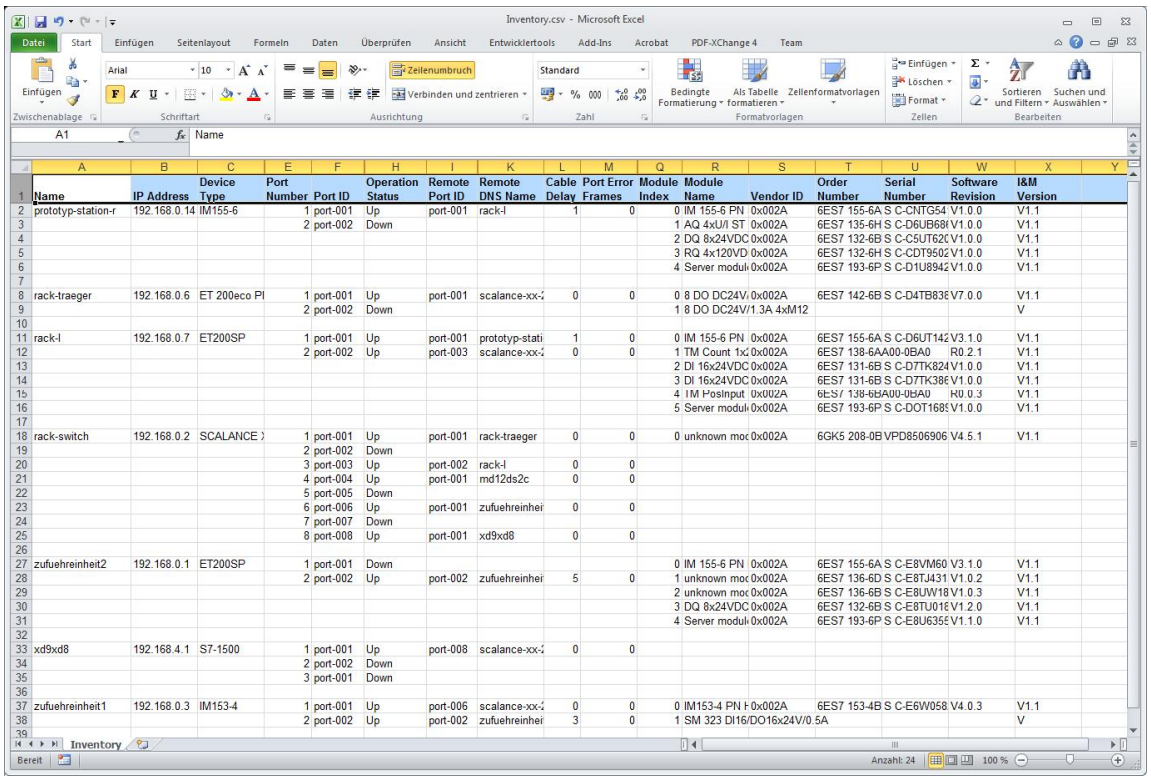
Figure 4-18



Name	IP Address	Device Type	Port Number	Port ID	Operation Status	Remote Port ID	Remote DNS Name	Cable Delay	Port Error Frames	Module Index	Module Name	Vendor ID	Order Number	Serial Number	Software Revision	I&M Version
prototyp-station-r	192.168.0.14	IM155-6	1	port-001	Up	port-001	rack-l	1	0	0	IM 155-6 PN	0x002A	6ES7 155-6A	S C-CNTG54	V1.0.0	V1.1
			2	port-002	Down					1	AQ 4xU/I ST	0x002A	6ES7 135-6H	S C-D6UB68	V1.0.0	V1.1
										2	DQ 8x24VDC	0x002A	6ES7 132-6B	S C-C5UT62	V1.0.0	V1.1
										3	RQ 4x120VD	0x002A	6ES7 132-6H	S C-CDT950	V1.0.0	V1.1
										4	Server modul	0x002A	6ES7 193-6P	S C-D1U894	V1.0.0	V1.1
rack-traeger	192.168.0.6	ET 200eco PI	1	port-001	Up	port-001	scalance-xx-	0	0	0	8 DO DC24V	0x002A	6ES7 142-6B	S C-D4TB83	V7.0.0	V1.1
			2	port-002	Down					1	8 DO DC24V/1.3A 4xM12					V
rack-l	192.168.0.7	ET200SP	1	port-001	Up	port-001	prototyp-stati	1	0	0	IM 155-6 PN	0x002A	6ES7 155-6A	S C-D6UT142	V3.1.0	V1.1
			2	port-002	Up	port-003	scalance-xx-	0	0	1	TM Count 1x	0x002A	6ES7 138-6AA00-0BA0		R0.2.1	V1.1
										2	DI 16x24VDC	0x002A	6ES7 131-6B	S C-D7TK824	V1.0.0	V1.1
										3	DI 16x24VDC	0x002A	6ES7 131-6B	S C-D7TK386	V1.0.0	V1.1
										4	TM PosInput	0x002A	6ES7 138-6BA00-0BA0		R0.0.3	V1.1
										5	Server modul	0x002A	6ES7 193-6P	S C-DOT168	V1.0.0	V1.1
rack-switch	192.168.0.2	SCALANCE >	1	port-001	Up	port-001	rack-traeger	0	0	0	unknown mo	0x002A	6GK5 208-0B	VPD8506906	V4.5.1	V1.1
			2	port-002	Down											
			3	port-003	Up	port-002	rack-l	0	0							
			4	port-004	Up	port-001	md12ds2c	0	0							
			5	port-005	Down											
			6	port-006	Up	port-001	zufuehreinhei	0	0							
			7	port-007	Down											
			8	port-008	Up	port-001	xd9xd8	0	0							
zufuehreinheit2	192.168.0.1	ET200SP	1	port-001	Down					0	IM 155-6 PN	0x002A	6ES7 155-6A	S C-E8VM60	V3.1.0	V1.1
			2	port-002	Up	port-002	zufuehreinhei	5	0	1	unknown mo	0x002A	6ES7 136-6D	S C-E8TJ431	V1.0.2	V1.1
										2	unknown mo	0x002A	6ES7 136-6B	S C-E8UW18	V1.0.3	V1.1
										3	DQ 8x24VDC	0x002A	6ES7 132-6B	S C-E8TU016	V1.2.0	V1.1
										4	Server modul	0x002A	6ES7 193-6P	S C-E8U635	V1.1.0	V1.1
xd9xd8	192.168.4.1	S7-1500	1	port-001	Up	port-008	scalance-xx-	0	0							
			2	port-002	Down											
			3	port-001	Down											
zufuehreinheit1	192.168.0.3	IM153-4	1	port-001	Up	port-006	scalance-xx-	0	0	0	IM153-4 PN H	0x002A	6ES7 153-4B	S C-E6W058	V4.0.3	V1.1
			2	port-002	Up	port-002	zufuehreinhei	3	0	1	SM 323 DI16/DO16x24V/0.5A					V

This information is important in the context of a device recall or necessary firmware updates. With a simple search in the inventory file (e.g. with Microsoft Excel or any other spreadsheet software), the devices requiring attention can be identified and maintained quickly and reliably.

4.6 Testing the Correct Wiring of the Distributed I/O

Task

The hardware in the network is to be analyzed, and sensors and actuators in the network are to be controlled and/or checked for correct wiring, even before a PLC has been integrated.

The results of these tests are logged to document the correctness of the configuration.

4.6.1 Checking the Station Configuration

Task

The configuration of the modular distributed periphery ET 200SP/S/MP/M/PRO/AL connected to your devices (that is, I/O modules etc.) is to be checked.

Implementation

You can view the actual module installation of a device at any time in two different ways:

1. In the Network Analysis Task(3.2), select the Online Mode (3.2.1).
2. Highlight the respective device in the Topology View or the Device Table.
3. By clicking on the “Details” triangle, open the detail view of the Devices list.

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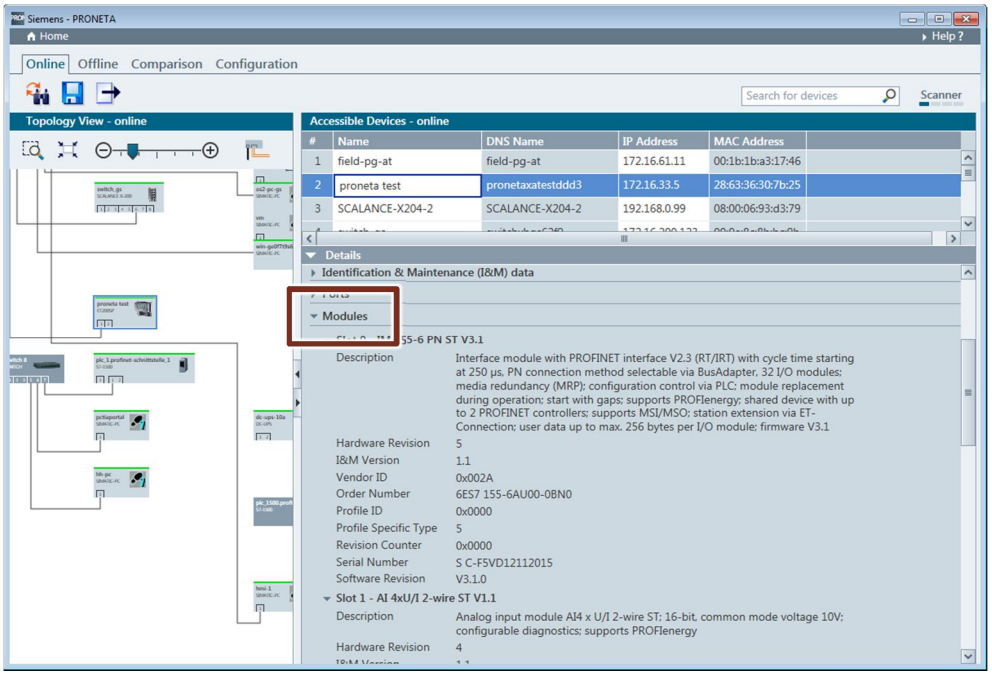
4. In the detail view, open the branch “Modules” by clicking its triangle.

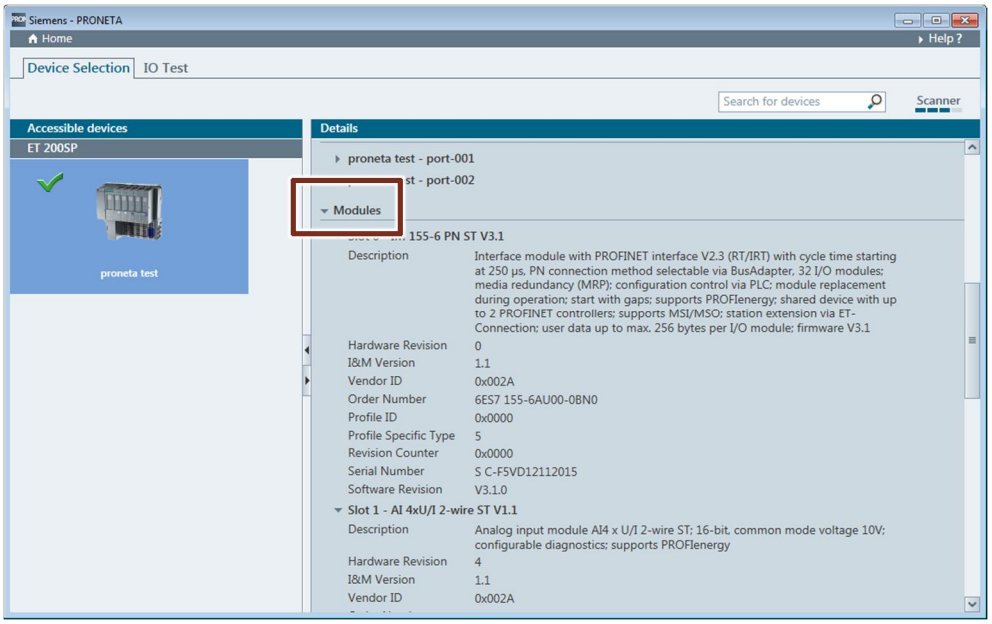
You can see the module configuration of the selected station. For details, you can open the branches corresponding to the individual slots.

Figure 4-19


Siemens - PRONETA
Home
Help ?
Online
Offline
Comparison
Configuration
Search for devices
Scanner
Topology View - online
Accessible Devices - online
Name DNS Name IP Address MAC Address
1 field-pg-at field-pg-at 172.16.61.11 00:1b:1b:a3:17:46
2 proneta test pronetaxatestddd3 172.16.33.5 28:63:36:30:7b:25
3 SCALANCE-X204-2 SCALANCE-X204-2 192.168.0.99 08:00:06:93:d3:79
Details
Identification & Maintenance (I&M) data
Modules
Description
Interface module with PROFINET interface V2.3 (RT/IRT) with cycle time starting at 250 µs, PN connection method selectable via BusAdapter, 32 I/O modules; media redundancy (MRP): configuration control via PLC; module replacement during operation; start with gaps; supports PROFIenergy; shared device with up to 2 PROFINET controllers; supports MSI/MSO; station extension via ET-Connection; user data up to max. 256 bytes per I/O module; firmware V3.1
Hardware Revision 5
I&M Version 1.1
Vendor ID 0x002A
Order Number 6ES7 155-6AU00-0BN0
Profile ID 0x0000
Profile Specific Type 5
Revision Counter 0x0000
Serial Number S C-F5VD12112015
Software Revision V3.1.0
Slot 1 - AI 4xU/I 2-wire ST V1.1
Description
Analog input module AI4 x U/I 2-wire ST; 16-bit, common mode voltage 10V; configurable diagnostics; supports PROFIenergy
Hardware Revision 4

You get to the same information by switching to the IO Test Task (3.3), entering the Device Selection Mode (3.3.1), and highlighting the respective device. In the right panel of the screen, module details will be displayed.

Figure 4-20


Siemens - PRONETA
Home
Help ?
Device Selection
IO Test
Search for devices
Scanner
Accessible devices
ET 200SP
proneta test
Details
proneta test - port-001
Modules
Description
Interface module with PROFINET interface V2.3 (RT/IRT) with cycle time starting at 250 µs, PN connection method selectable via BusAdapter, 32 I/O modules; media redundancy (MRP): configuration control via PLC; module replacement during operation; start with gaps; supports PROFIenergy; shared device with up to 2 PROFINET controllers; supports MSI/MSO; station extension via ET-Connection; user data up to max. 256 bytes per I/O module; firmware V3.1
Hardware Revision 0
I&M Version 1.1
Vendor ID 0x002A
Order Number 6ES7 155-6AU00-0BN0
Profile ID 0x0000
Profile Specific Type 5
Revision Counter 0x0000
Serial Number S C-F5VD12112015
Software Revision V3.1.0
Slot 1 - AI 4xU/I 2-wire ST V1.1
Description
Analog input module AI4 x U/I 2-wire ST; 16-bit, common mode voltage 10V; configurable diagnostics; supports PROFIenergy
Hardware Revision 4
I&M Version 1.1
Vendor ID 0x002A

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4.6.2 Checking the Signal Wiring: “IO Test”

Task

With the IO check, the wiring of the inputs and outputs of the I/Os used are checked to determine whether all devices have been connected correctly (“Force and monitor values””).

The test results are logged and saved to document the state of the system.

Preparations

1. In the start screen, select the IO Test Task (3.3).
2. Make sure that the device to be checked has a valid IP address and device name. You can make sure that this is the case by checking “Automatically assign temporary IP addresses” and “Automatically assign temporary devicenames” in the General Settings dialog (3.4.1).
3. In Device Selection Mode (3.3.1), click on the module to be checked.
   In the right-hand part of the window, you can see a table with details of the selected device.
4. To proceed to the IO test, select the IO Test Mode tab, or double-click on the device icon.

WARNING

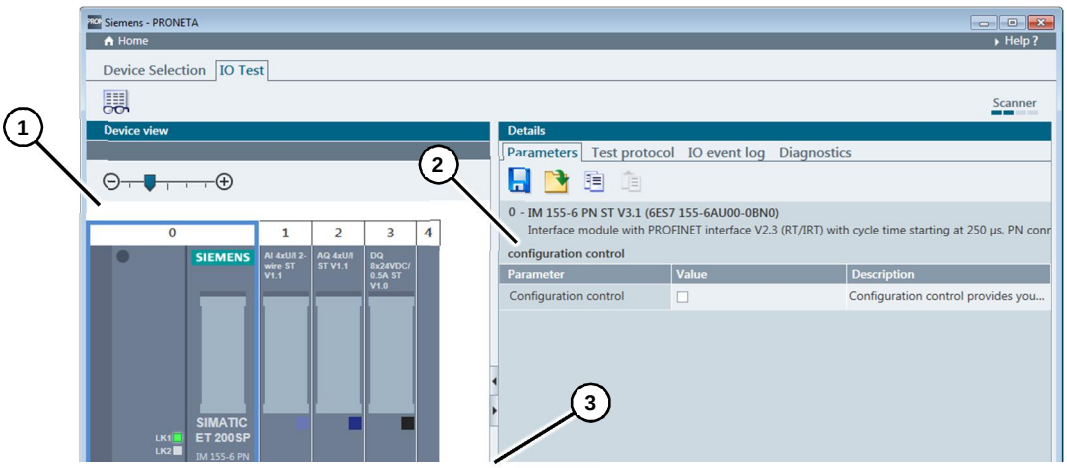
Forcing inputs and outputs on control components can result in sudden movement of the machinery and the electrification of equipment.

Physical injury and electrical shock to personnel are consequently possible.

Make sure the machinery is in a safe state with no unauthorized personnel within range, before turning the IO test on.

The IO test mode window consists of two segments: A Device View (1) on the left half of the window, and a Details View (2) on the right half. By dragging the dividing bar (3) between them to the left or the right, you can adjust the size of the segments.

Figure 4-21



The device view on the left gives you a graphical overview over the device you currently want to test, while the tables on the right side provide you with information about the test progress.

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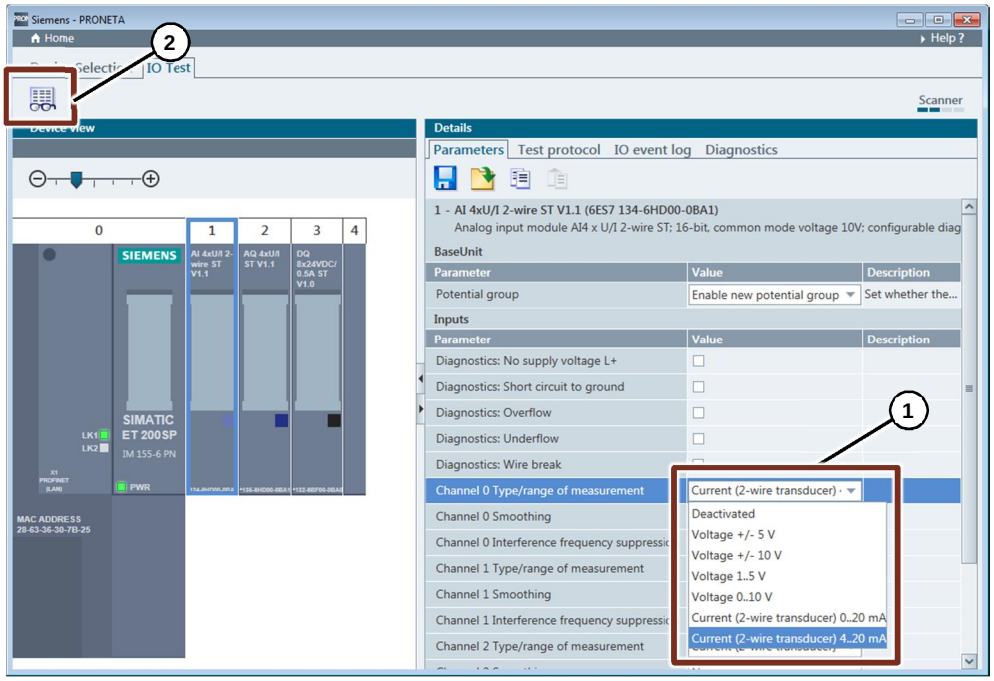
5. Select a module, and click on the “Parameters” tab in the details view to adjust the parameters of the I/O modules to your actual configuration. For example, enter the voltage measurement range for analog signals in the respective field (1) of the table. If you leave a field unchanged, its default value will be used.
   Repeat this step for all modules you want to check before turning to the actual test procedure.

Figure 4-22



6. Click the “Force and monitor values” (2) icon in the function bar. This will establish a PROFINET application relation to the device. You can now start with the I/O test for the device.

NOTE At any given time, only one PROFINET application relation (AR) can be established for one device. Make sure that no other PROFINET controller occupies this connection.

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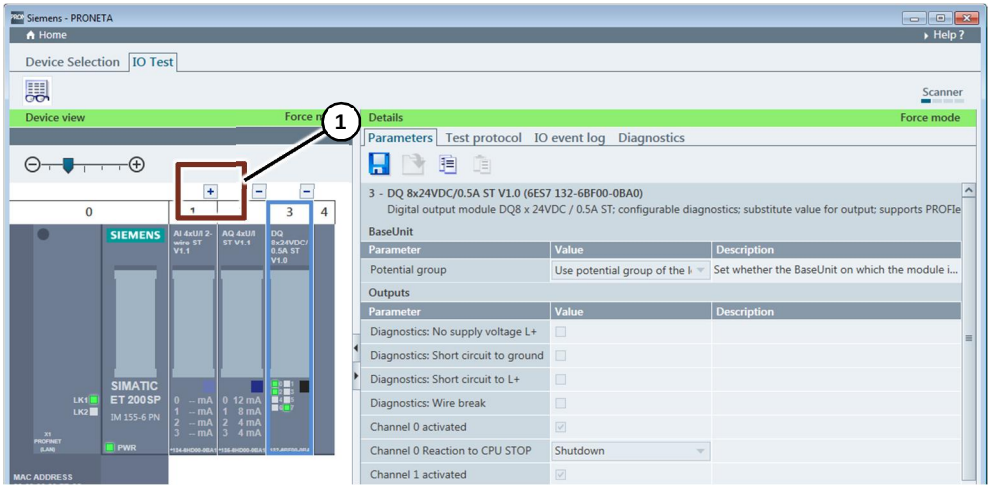
Monitoring the Installation

When a connection is established, the header bars of both the device and the details view will turn light green to indicate that you operate in Force mode.

Figure 4-23



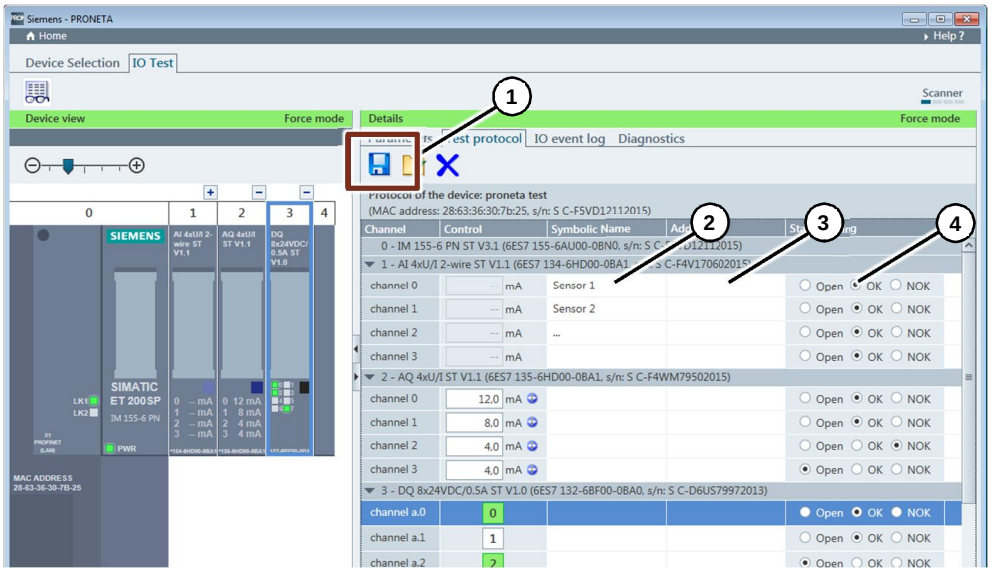
You can now monitor the status of digital inputs with the LED representations in the device view of the respective module, while for analog inputs the current value is displayed. Digital outputs can be monitored and forced by watching and clicking on the LED representations.

Use the Popup Window for a larger display of the modules by clicking on the “+” symbol (1) above the corresponding module in the device view.

Performing and Documenting the Tests

7. Go to the “Test protocol” tab in the details view.
8. If you want to continue a previous or incomplete test of a configuration, use the “Load Protocol” (1) icon from the function bar, to pick up your work from where you left. Otherwise, simply begin with the test procedure.

Figure 4-24



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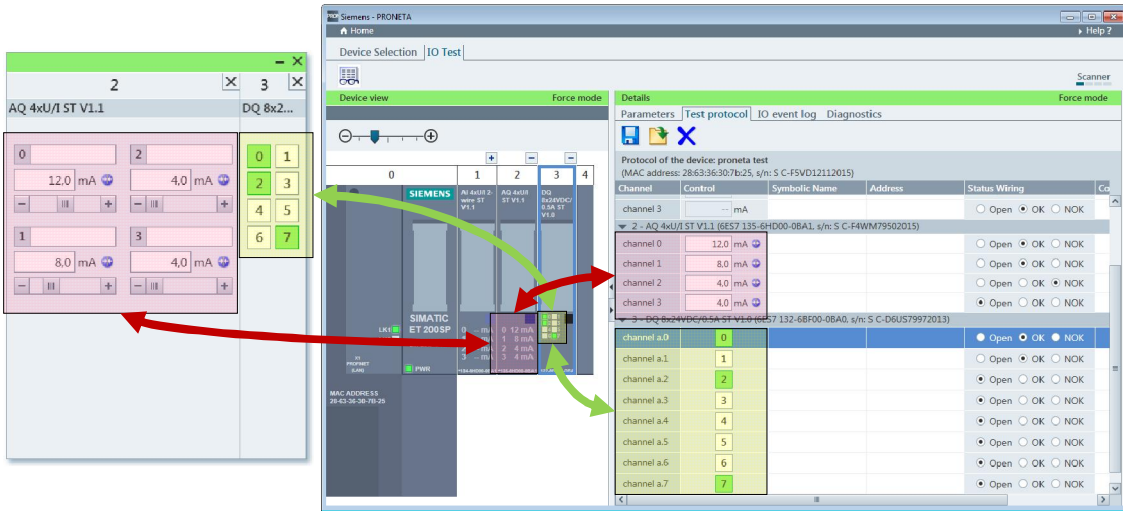
In the “Test protocol” tab, you can assign names for the individual connections in the “Symbolic Name” (2) column, and enter the address of the memory image in the “Address” (3) column. These are intended only as memory aids for the tester and have no effect on the actual configuration.

The “Comment” column gives you space for additional comments.

9. Check your wiring by applying different signals to your inputs and setting the outputs, and monitor the observed effects in your installation.
   In “Status Wiring” (4), enter the respective test result for all connections.
   By default, all tests are marked “Open”. Change this to “OK” if everything goes according to plan, or to “NOK” (“Not okay”) if you found any faults.

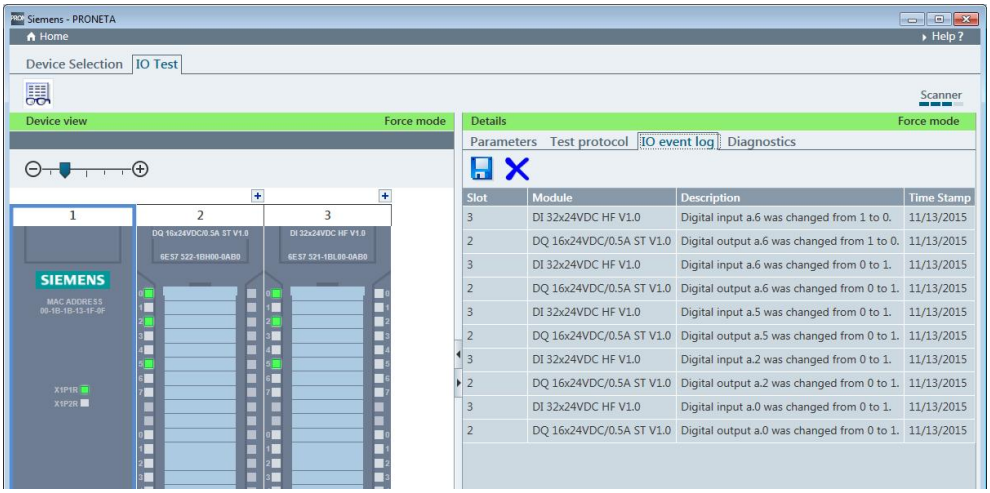
Note that reading and writing information to module interface is possible in several different places. In the image below, all areas shaded pink control the same analog module, while all areas shaded green effect the same digital module. Use the popup window to get a magnified representation of the interface values.

Figure 4-25



10. Check also which reactions your interventions provoked in the “IO event log” and “Diagnostics” tabs of the Details View.

    Figure 4-26


Siemens - PRONETA
Home
Help ?
Device Selection
IO Test
Scanner
Device view
Force mode
Details
Force mode
Parameters
Test protocol
IO event log
Diagnostics
SIEMENS
Slot
Module
Description
Time Stamp
3 DI 32x24VDC HF V1.0 Digital input a.6 was changed from 1 to 0. 11/13/2015
2 DQ 16x24VDC/0.5A ST V1.0 Digital output a.6 was changed from 1 to 0. 11/13/2015
3 DI 32x24VDC HF V1.0 Digital input a.6 was changed from 0 to 1. 11/13/2015
2 DQ 16x24VDC/0.5A ST V1.0 Digital output a.6 was changed from 0 to 1. 11/13/2015
3 DI 32x24VDC HF V1.0 Digital input a.5 was changed from 0 to 1. 11/13/2015
2 DQ 16x24VDC/0.5A ST V1.0 Digital output a.5 was changed from 0 to 1. 11/13/2015
3 DI 32x24VDC HF V1.0 Digital input a.2 was changed from 0 to 1. 11/13/2015
2 DQ 16x24VDC/0.5A ST V1.0 Digital output a.2 was changed from 0 to 1. 11/13/2015
3 DI 32x24VDC HF V1.0 Digital input a.0 was changed from 0 to 1. 11/13/2015
2 DQ 16x24VDC/0.5A ST V1.0 Digital output a.0 was changed from 0 to 1. 11/13/2015

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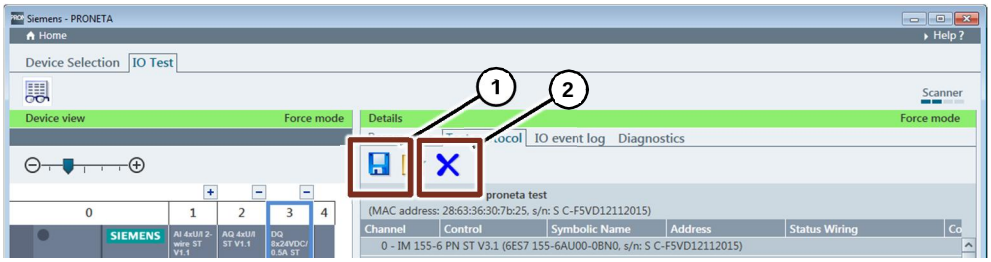
The IO event log tab (above) records all changes applied to inputs and outputs of the connected modules. The Diagnostics tab reflects the state of the device's diagnostics buffer, which contains error messages like the pulling of a module.

When you have completed your installation check, or if you want to interrupt your work to proceed at a later time, you can save your results at any time with "Save Protocol" (1) from the function bar. (See below)

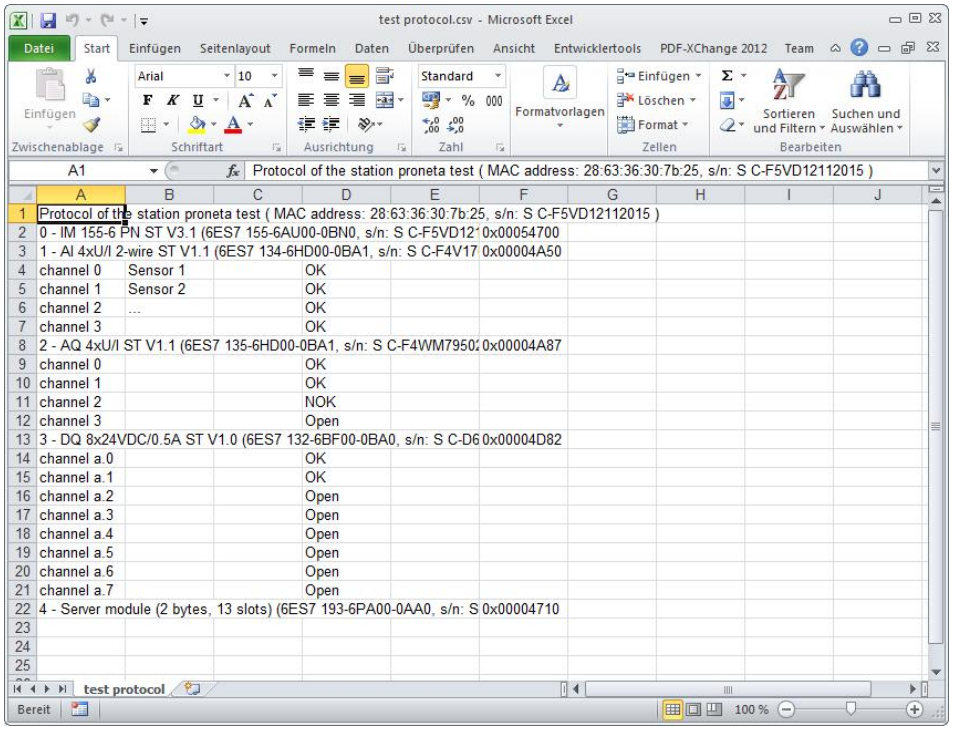
To delete the results entered so far and start over from scratch, use "Reset test protocol" (2) from the "Test protocol" tab.

Figure 4-27



11. Repeat the previous steps for all the modules to be checked.
12. When you are done, save your test results to document the correct state of your installation.

Figure 4-28



The resulting test protocol can be opened for further processing with any spreadsheet software, for example Microsoft Excel.

This provides you with a simple and reliable method to test and document your installations wiring. Note that, besides the PC running PRONETA and your PROFINET devices, you do not require any additional hardware or configuration software to perform these tests.

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5 Related Literature

Table 5-1

	Topic	Title / Link
\1\	Siemens Industry Online Support	http://support.industry.siemens.com
\2\	Download page of this entry	https://support.industry.siemens.com/cs/ww/en/view/67460624
\3\	PRONETA Homepage	http://w3.siemens.com/mcms/automation/en/industrial-communications/profinet/productportfolio/proneta/Pages/proneta.aspx

6 History

Table 6-1

Version	Date	Modifications
V1.0	02/2013	First version
V2.0	10/2013	Adapted to PRONETA 2.0.8.4
V2.3	11/2015	Complete rewrite, adaptation to PRONETA 2.3

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